Paper

Jan. 12, 1951

WHAT FACTORS SHOULD BE CONSIDERED IN SELECTING LUBRICATING OILS?

HOW DO SUPPLIERS CONTRIBUTE TO DEVELOPMENT IN THE INDUSTRY?

WHAT IS THE STATUS OF THE PULPWOOD INDUSTRY IN THE LAKE STATES? 4

WOOD PULP

G

Established 1886

"Ring out the old,
Ring in the new!"
TENNYSON

We enter the new year—our sixty-fifth in Pulp and Paper—with confident expectation.

Technical advances . . . unequalled skill and facilities . . . the unceasing stimulus of American free enterprise . . . all will help make 1951 a year of further progress and achievement for the industry.

GOTTESMAN & COMPANY

— INCORPORATED —

100 PARK AVENUE • NEW YORK 17, N. Y.

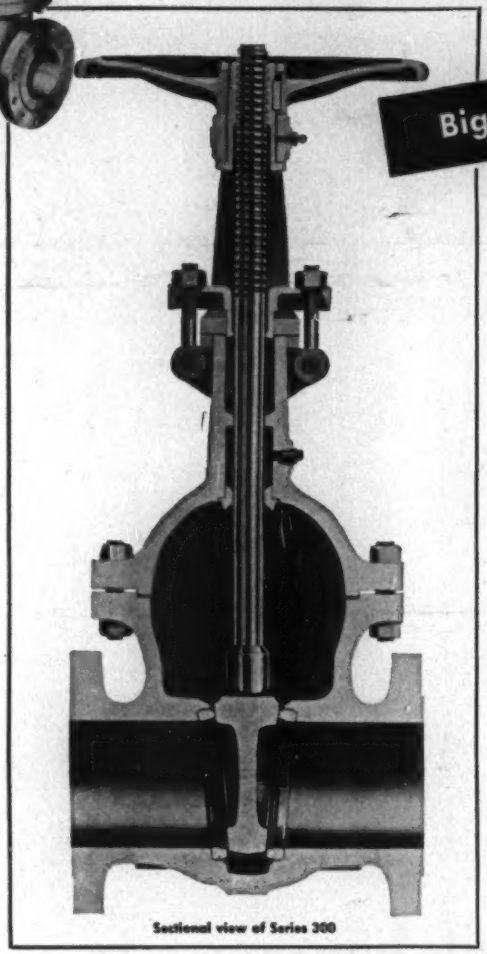
EUROPEAN OFFICES: Birger Jarlsgatan 8, Stockholm, Sweden

WALWORTH

Cast Steel Gate Valves

Series 150 and 300

Wedge Gate — Outside Screw and Yoke



Sectional view of Series 300

Big 8-Point Superiority!

Gland clearances are such that stem cannot be scored if gland should be tightened unevenly.

Deep Stuffing Boxes in all sizes (2" to 24") insure tightness and maximum packing life — costly leaks are eliminated.

Bonnets and Bodies are engineered to withstand pressure and minimize distortion — they're tough, durable, dependable.

Heavy Steel Walls provide extra strength and longer life.

Integral Body Guide Rib Faces are machined to insure accurate disc seating.

Seat Rings are bottom seated — not flange type. No recess exists at back of ring — hence no turbulence, erosion, or pressure drop.

Streamlined Ports allow high velocity, non-turbulent flow, and reduce the possibility of erosion.

Valves regularly have flanged ends. They can be supplied with ends for butt welding. Roller bearing yokes are available. On valves 5 inches and larger, by-passes can be furnished.

For Series 600 and higher, we recommend Walworth Pressure-Seal Steel Gate Valves.

For further information on Walworth Cast Steel Gate Valves, see your local Walworth distributor, or write:

WALWORTH

valves and fittings

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Here's the process pump

Your Maintenance Man Would Pick

The new De Laval CP Process Pump is designed to require as little service as possible and to make that servicing as easy as possible. For instance:

1. **PARTS ARE STANDARDIZED** Two different sizes of shafts, bearings, bearing cartridges, and pedestals fit the entire line of seven pumps.
2. **BEARINGS ARE PERMANENTLY LUBRICATED** Like the permanently lubricated bearings in a modern motor, the pump bearings never need attention.
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4. **AND, MANY OTHER FEATURES** In a score of ways, the De Laval CP pump is a really improved general service pump—packed or mechanical shaft seals are interchangeable—eductor vanes on the back of the impeller reduce stuffing box pressure—an extra large impeller eye keeps entrance velocities low—and inlet and outlet water cooling connections are provided for the shaft seal. The CP pump is furnished with either open or closed impellers for pumping clear viscous or corrosive fluids. Capacities 15 to 600 gpm. Heads 15' to 200'

For complete information, capacities and dimensions, send for Bulletin 1125-2-P7

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DE LAVAL STEAM TURBINE COMPANY, TRENTON 2, N. J.

TURBINES • HELICAL GEARS • CENTRIFUGAL BLOWERS AND COMPRESSORS
CENTRIFUGAL PUMPS • WORM GEAR SPEED REDUCERS • IMO OIL PUMPS

CP-2

This electric furnace brews a "shock" for corrosion

Corrosion—a big trouble-maker in welded equipment—will get a surprise from the "heat" of special Armco ELC Stainless Steel being poured here. With a maximum carbon content of only .03%, extra-low carbon Types 304 ELC and 316 ELC have little to fear from corrosion near weld areas.

With standard stainless grades, the areas near the welds are subject to intergranular corrosion due to harmful carbide precipitation. Low carbon content of Armco ELC stops this threat in service up to 800° F.

Formerly this problem was solved either by annealing regular stainless grades after welding, or by using stainless types stabilized with columbium or titanium. The ELC grades not only eliminate annealing after welding, but they cost less than the stabilized grades.

Armco ELC grades are being used increasingly for digesters, blow-pit gas recovery systems, paper machines, and other equipment exposed to corrosion.

Write for your copy of "A Stainless Profit Story." This booklet gives you new and factual test data on metals used in various equipment in pulp and paper mill production.

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DATES TO REMEMBER

JANUARY 15-18, 1951: Plant Maintenance Show & Conference, Public Auditorium, Cleveland, Ohio.

JANUARY 22-26: Tenth International Heating & Ventilating Exposition, Commercial Museum, Philadelphia, Pa. (Am. Society of Heating & Ventilating Engineers).

JANUARY 24-26: Canadian Pulp & Paper Assn., Mount Royal Hotel, Montreal, Que.

FEBRUARY 19-22: Technical Assn. of Pulp & Paper Industry, Annual Meeting, Hotel Commodore, N. Y. C.

FEBRUARY 19-22: American Paper & Pulp Assn., Annual Meeting, Waldorf-Astoria Hotel, N. Y. C.

FEBRUARY 21: Mass. Institute of Technology Alumni, Annual Luncheon in connection with TAPPI convention; 12:00 noon, Engineer's Club, N.Y.C.

FEBRUARY 21: New York State College of Forestry, Paper and Pulp Alumni: Annual Luncheon, Hendrick Hudson Room, Roosevelt Hotel, N. Y. C.

FEBRUARY 21: University of Maine, Paper and Pulp Alumni: Annual Meeting, Biltmore Hotel, N. Y. C.

NEXT WEEK

A description of a new stock Preparation Plant using some Unorthodox Methods is contained in "Continuous Stock Preparation In a Six-Machine Fine Paper Mill" by Björn Sucksdorff.

The fiber properties inherent in various species, the effect of decay on pulp quality, and the characteristics of the pulps obtainable from the Northeast, Lake States, South and Pacific Northwest are described in "Relation Between Wood and Pulp Properties" by W. F. Holzer.

IX Article in the Corrosion Series "The Protection of Electrical Equipment from Corrosion in Pulp and Paper Mills" by G. W. Knapp.

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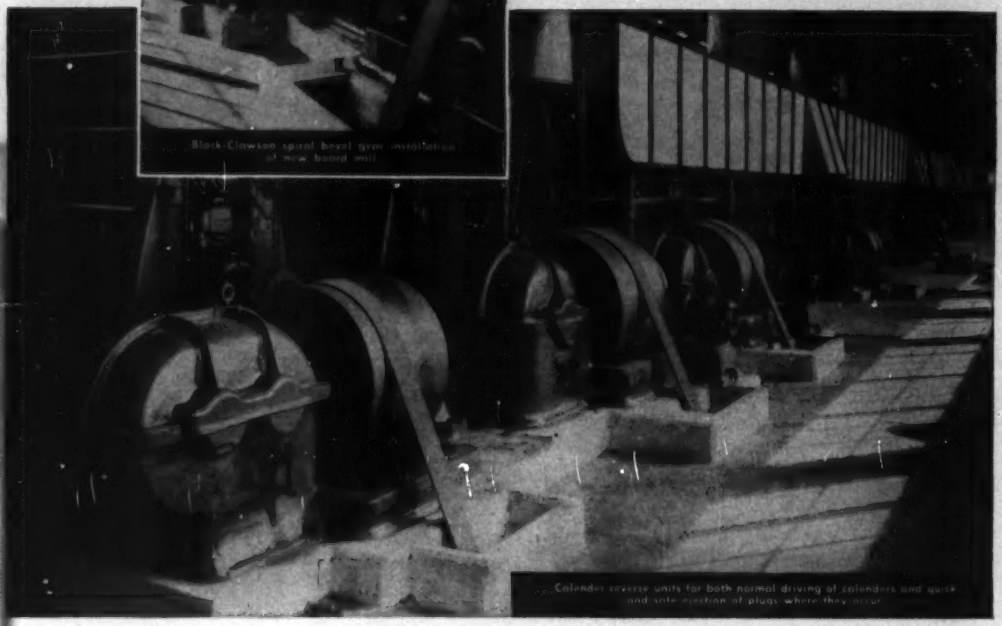
The DRIVE
that really pays off



Hitch your paper machine to the most dependable make of drives that money can buy and you will avoid many a shut down for repair and many a production loss.

There is no better drive in existence than the Black-Clawson—no more generally used drive—no more dependable drive.

B-C drives are exceptionally rugged. They're quiet. They're virtually vibrationless. They're easy to synchronize to the required variations in speed of the several sections of the machine—particularly new machines.

- Spiral bevel gear
- Extended Shaft (Double Reduction with or without Airflex Clutch operation)
- Hypoid gear
- Calender reverse
- Dryer inching

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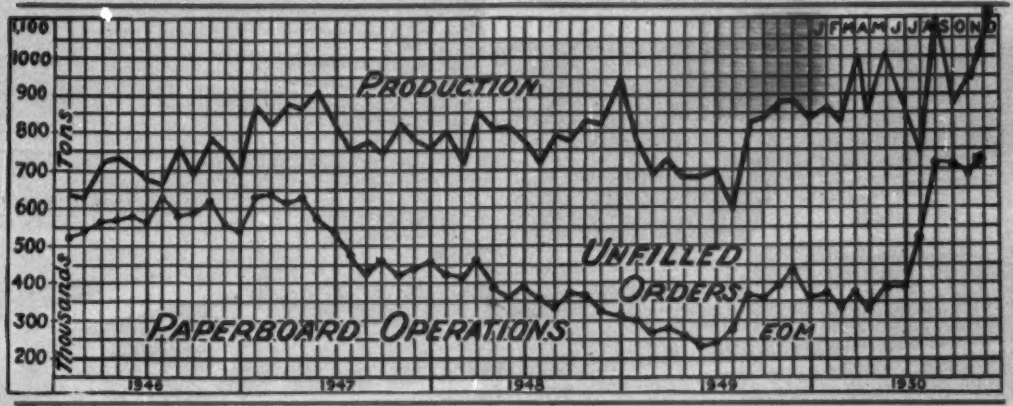
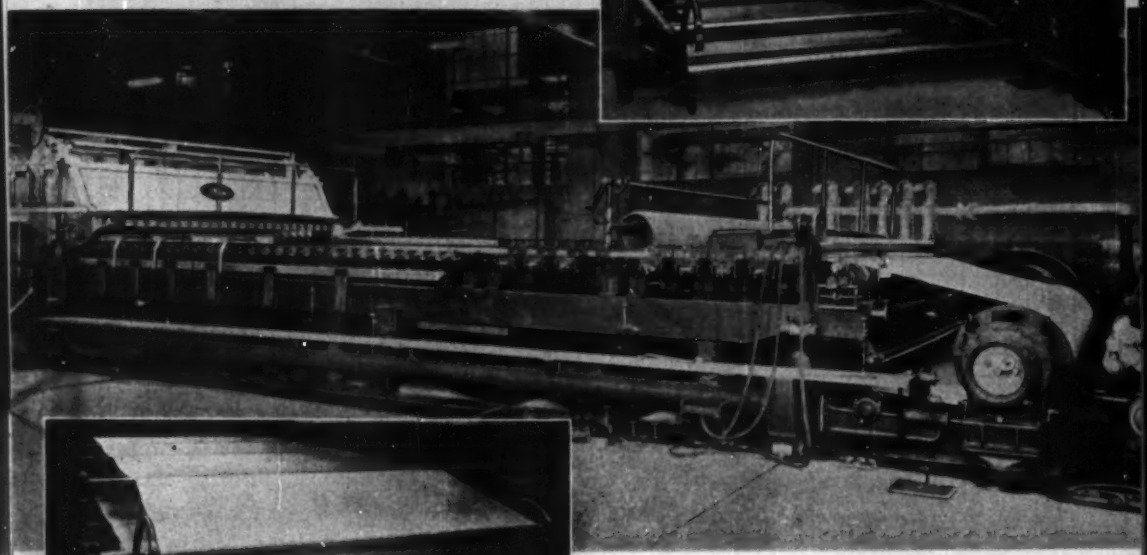


Weekly Brief of Important Figures

Source	Production	Dec. 30, '50	Dec. 2, '50	Dec. 31, '49
		WEEK ENDING		
APPA	Paper Production percent 6-day Capacity	74.9	104.1	72.7
	Unbl. Kraft Paper Production percent	59.9	94.1	55.2
NPA	Paperboard Operating Ratio percent inch hours	63.0	101.0	53.0
		Nov. 1950	Oct. 1950	Nov. 1949
APPA	Paper Production* (Except Newsprint and Building Papers) Tons	872,000	865,566	762,099
	New Orders Tons	831,000	869,360	754,993
	Unfilled Orders Tons	869,900	911,147	496,770
	Shipments Tons	872,000	870,497	755,367
		Dec. 1950	Nov. 1950	Dec. 1949
NPA	Paperboard Production Tons	862,905	1,168,958	827,400
	New Orders Tons	778,394	1,225,369	801,200
	Unfilled Orders Tons	617,245	722,046	359,300
	Our Customers Activities Index[1]	Latest Mo.[3]	Previous Mo.[3]	Year Ago[3]
FRS	Manufactures Total Index	228	225	179
	Durable Mfg. Index	262	254	176
	Nondurable Mfg. Index	201	201	181
	Chemical Products Index	280	272	245
	Mfg. Food Products Index	178	193	177
	Printing and Publishing Index	181	173	169
ODC	Magazine Advg.-Printer's Ink Index	342	338	294
	Retail Sales Combined Adjusted Index	323.3	332.3	294.4
	Drug Index	223.4	227.8	220.0
	General Merchandise Group Index	299.2	321.5	273.9
	Grocery and Combination Index	394.7	391.2	358.8
	Prices Index			
BLS	Consumers Price Index[1]	174.8	173.8	168.5
	Wholesale all Commodities[2]	169.1	169.5	152.2
	Wholesale Foods[2]	172.5	177.2	159.6
	Commodities other than Farm Products and Foods[2]	161.5	159.2	145.0
	Wholesale Pulp and Paper[2]	173.4	167.1	156.5
	Purchasing Power of Dollar, Consumers Prices[1]	47.8	48.0	49.9
	General Activity Index			
FRS	Mfg. Production-Worker Payroll	403.6	393.9	335.1
	Unemployment Compensation Initial Claims (M)	720	558	1,363
	Miscellaneous Carloadings–Thousands of Cars	1,673	1,963	1,277
	Electric Output (Million KW hr.)	34,307	32,650	28,169
PTJ	Average 32 P & P Common Stocks as of Jan. 2	$35.17	$32.40	$30.11
	Average Indicated Dividends Common Stocks as of Jan. 2	$ 2.41	$ 2.57	$ 2.17

[1] 1935-39=100 Unadjusted Index
[2] 1926=100
[3] For details see APPA Monthly Statistical Summary—November 1950 Estimated Figures
[4] Latest Month Available on Request

At right: undercarriage rolled into tending side aisle on suitable tracks ready for wire draping operation.



Above: Fourdrinier Part of improved "Rapi-Drape" design shown in operating position.

At left: wire draped on undercarriage ready for installation.

Wire Changing Time:

55 Minutes

Here is a simplified, fast, safe method of changing Fourdrinier Wires. Down-time is greatly reduced. Operators report a complete wire change in 55 minutes or less. Takes less aisle space and there are no heavy parts to handle. No danger of deflection stresses or distortion as experienced with complete removal or cantilever change. Unnecessary to disconnect shake connections, suction boxes or showers.

In "Rapi-Drape" Wire Handling, pioneered by Puseyjones, the Fourdrinier as a unit remains in the operating position. The breast roll and the stretch roll are lowered, and the couch roll cantilevered to provide clearance. The back of the Fourdrinier is supported on frames. Features include a removable, power-operated undercarriage which supports the front side in perfect alignment at all times. Only parts which must be removed are the dandy roll, deckle and cut squirts.

Get the complete "Rapi-Drape" story . . . talk to a Puseyjones engineer.

"Rapi-Drape" Wire Handling is now being used successfully in these outstanding mills:

Southland Paper Mills, Inc., Lufkin, Texas
Hollingsworth & Whitney Company, Mobile, Ala.
Southern Advance Bag & Paper Co., Hodge, Ala.
St. Mary's Kraft Corp., St. Mary's, Ga.
Union Bag & Paper Corp., Savannah, Ga. (2)
Hudson Pulp & Paper Co., Palatka, Florida (2)
Southern Paper Board Corp., Port Wentworth, Ga.
Fibreboard Products Inc., East Antioch, Cal.
St. Regis Paper Co., Tacoma, Wash.
Calcasieu Paper Co., Elizabeth, La.
San Rafael Paper Co., Mexico, D.F.
Papierfabrik Utzenstorf, Switzerland
National Newsprint Co., Ltd., India
Everett Pulp & Paper Co., Everett, Wash.

THE PUSEY AND JONES CORPORATION

Established 1848. Builders of Paper-Making Machinery

Fabricators and Welders of All Classes of Steel and Alloy Products

Wilmington 99, Delaware, U.S.A.

THE SIGN OF TRADE MARK SUPERIOR QUALITY

Paper TRADE JOURNAL

TRENDS

Office of the PAPER TRADE JOURNAL,
Wednesday, January 10, 1951.

Price Stabilization

It's a question on everyone's mind and since December 1, there has been more confusion than fact. However, at present the voluntary system still seems in vogue until such time as the machinery is ready to function.

March seems to be the deadline talked of, for this machinery to start rolling. In the meantime, the telegram method of requesting seven day notice of price increases seems to be S.O.P. The problems involved seem almost unsurmountable, and when and if the policies are set, appeal procedure must be swift and easy to set going to correct the injustices bound to occur.

With the paper industry at peak capacity and with our paper makers dependent on imports to keep running, paper price control without relief can grind these dependent mills to a sudden stop.

There does not seem to be any sound method of controlling prices for imports and still obtain the current volume of tonnage.

So far as the waste paper substitutes for pulp are concerned, in many cases these grades are selling higher than the contract pulps they surplant.

How will they be rolled back? With price control applied only to American producers, with imports able to raise at will. **Is this fair to American producers who have kept their prices at lower levels?**

We also find grades of paper selling for less than the pulp they are made from. Several of these items are primarily made by integrated mills, who also convert. Probably only this conversion makes a reasonable profit possible.

This integrated conversion as it consumes more paper or board raises problems for the smaller converter as he feels the pinch from his supplier. In fact, at least one small one has appealed to his congressman for help.

Can we hope to keep the small mill or converter going? How important are they to the economy and war preparation?

How much has this increase in raw materials been passed on to the consumers? As an example, contract prices on bleached sulphite have gone up about $60, soft white shavings $85, groundwood $18-$20, and yet machine coated groundwood book paper has averaged only $20 per ton increase during 1950.

Headaches and confusion certainly with more to come. We find always behind the shortage the word allocation. We had it last time with Canada and Great Britain in the pool with us. Now it is possible that all the countries outside of the Iron Curtain will be in the pool. Thus we will find copper, sulphur, pulp, pulpwood on nearly world-wide allocation. ECA money will apparently be available for payment. We may even be competing pricewise with our own funds.

Maybe allocation of American commodities at fixed prices can be the bargaining point for imports at fixed prices, frozen at some specific date.

Certainly a strong, clear statement of policy is required now.

And while we are on this subject which really is shortages, **how does this industry rate in essentiality compared to steel, rubber, plastics, lumber or railroads?** The last time it was on the low end of the Totem Pole.

The record shows for the past two months that the production rate was 26,500,000 tons per year against a theoretical capacity of 24,500,000 tons. *Is this rate of production necessary for our preparedness?* If not, how much is required for the armed forces, government and a minimum basic civilian demand?

Certainly the present production levels cannot be sustained, with the Armed Forces manpower requirements increasing, stocks of raw materials declining rapidly, some are already on a hand to mouth basis, and still others are on sharp restriction.

The answer in normal times is expansion, and maybe it still is under present conditions. However, before any marked increase can be planned and financed, **a strong policy has got to be made covering all equipment needed as well as the man to build the expansion, run it and supply the raw materials.**

When the policy is once decided, it can not be changed from week to week.

Without such plans we are faced with deciding: what grades are essential, what mills can run, and how they will be run.

There is no word which can describe the far reaching effect of these decisions. God give the men the wisdom to make them right. —H. J. P.

UNITED STATES IMPORTS OF PULPWOOD, WOOD PULP, PAPER, PAPERBOARD, AND PAPER PRODUCTS—FIRST NINE MONTHS, 1950-1949

In Short Tons Except Where Otherwise Indicated

	First 9 Months		Per Cent Change
	1950	1949	
Pulpwood, Total (in cords of 128 cu. ft.)	1,007,092	1,104,403	— 8.8
Rough	269,296	393,767	— 31.6
Peeled	625,839	676,991	...
Rossed	75	299	— 74.9
Chipped	111,882	83,346	+ 35.9
Wood Pulp, Total	1,755,640	1,132,899	+ 55.0
Bleached sulphite, rayon and special chemical grades	177,883	109,070	+ 63.1
Bleached sulphite, other	298,674	206,086	+ 44.9
Unbleached sulphite	377,860	241,859	+ 56.2
Bleached sulphate	328,412	276,277	+ 18.9
Unbleached sulphate	336,734	135,643	+ 148.3
Soda pulp	25,029	18,973	+ 31.9
Chemical screenings	3,293	2,264	+ 45.5
Bleached groundwood	10,610	.....	...
Unbleached groundwood	192,519	139,352	+ 38.2
Groundwood screenings	4,626	3,375	+ 37.1
Waste fibrous materials, Total	77,027	50,139	+ 53.6
Rags for paper stock	11,268	5,688	+ 98.9
Other pulp—rag, straw, esparto, etc.	.....	(1)	...
Other waste fibrous materials	65,759	44,473	+ 47.9
Paper, paperboard and paper products, Total	3,705,291	3,516,383	+ 5.4
Paper and paperboard, Total	3,699,924	3,512,733	+ 5.3
Paper, Total	3,643,553	3,459,279	+ 5.3
Newsprint	3,607,093	3,431,798	+ 5.1
Printing and Book Paper, uncoated	26,441	22,197	+ 19.1
Fine paper, Total	717	418	+ 71.5
Writing paper	93	26	+ 257.7
Cover paper	(1)	(1)	...
Bristols	172	63	+ 173.0
Thin paper	362	266	+ 36.1
Other fine paper	90	63	+ 42.9
Wrapping, bag, and Converting paper, Total	7,873	3,364	+ 134.0
Greaseproof	660	38	+1636.8
Vegetable parchment	9	9	...
Kraft wrapping	5,765	2,636	+ 118.5
Wrapping paper, except kraft	1,439	679	+ 111.9
Tissue and Crepe paper	396	1,129	— 64.9
Asphalt paper	95	92	+ 3.3
Building paper	938	281	+ 233.8
Paperboard, Total	56,371	53,454	+ 5.5
Kraft container board	22	.....	...
Other container and boxboard	188	5	...
Other paperboard	35,403	37,169	— 4.8
Fiber insulation board	1,744	74	+2256.7
Wallboard	19,014	16,206	+ 17.3
Paper products, Total	5,367	4,633	+ 15.8

Source: Bureau of the Census. (1) Less than one-half ton.

Paperboard Production (Tons)*

	Dec. 29 1950	Dec. 23 1950	Dec. 31 1949	Month of Dec.
Production	139,385	241,058	111,463	862,904
New Orders	158,208	171,484	147,044	778,394
Unfilled Orders	617,245	598,431	359,271	617,245

* Source: NPA.

NO, SIR! The Seal Won't Blow!

METALLIC-BACKED neoprene seals are used in this famous bearing—and they are engineered to *stay put*. They can't blow.

Your lubricant stays in; dust and dirt stay out; the result is years and years of trouble-free performance.

The "SC" Bearing is a new member of the Dodge 30,000 hour line. Modern styling. Rugged one-piece cast iron housing. Long inner race. Radial and thrust load capacity. Fully self aligning. *WRITE* for special "SC" bulletin, giving complete specifications.

DODGE MANUFACTURING CORPORATION, 2900 Union St., Mishawaka, Ind.

DODGE TYPE "SC" BALL BEARING PILLOW BLOCK

Precision built bearing for small shafts and moderate loads. Pillow blocks, flange bearings and hanger bearings available from distributors' stocks in shaft sizes ranging from 3/4" to 2-7/16".

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained, he can give you valuable assistance on new, cost saving methods. Look for his name under "Power Transmission Equipment" in your classified telephone book.

DODGE

of Mishawaka, Ind.

FIRST IN POWER TRANSMISSION MACHINERY

FOR YOUR NAME PLATE REQUIREMENTS, WRITE OUR SUBSIDIARY, CHICAGO THRIFT ETCHING CORPORATION, 1555 N. SHEFFIELD AVE., CHICAGO, ILLINOIS

News of the Week

Paper TRADE JOURNAL

COLUMBIA CELLULOSE TO START

PRINCE RUPERT, B. C. — The large new dissolving pulp mill of Columbia Cellulose Co., Ltd., near Prince Rupert, is now in the final stage of construction and will come into production in February, Harold Blancke, president, states. All major equipment is installed, he added, and only the slow delivery of a few items of minor equipment will prevent an earlier start-up of the plant.

Initial output of the Prince Rupert pulp mill will be at an annual rate of approximately 70,000 tons, the equivalent of a 20 percent increase in present supplies. It is possible that within a short time after operations get under way this production level will be lifted in a further effort to bring about a better balance of supply with demand.

BUY ST. RAYMOND OUTPUT

The *New York Daily News* has bought debentures in the St. Raymond Paper Co. mill, Quebec, with an arrangement whereby most of the newsprint output eventually will be sold to that paper.

St. Raymond Paper, Ltd., recently was acquired by a group of Montreal bankers and investment brokers, headed by John Blais, who is now president of the firm. The seller was the Estate of Lord Atholstan, onetime owner of the *Montreal Stor*.

John Coffin, president of Madden, Reeve, Angel Co., paper brokers in New York City, is a principal stockholder in the new company but holds no office.

ST. HELENS EXPANDS

St. Helens Pulp and Paper Co., St. Helens, Ore., has announced a new modernization and expansion program that is expected to be completed within the next two to three years if the availability of equipment and materials continue on the present basis. The Board of Directors recently authorized the expenditure of $3,600,000 in the furthering of this program, according to Max Oberdorfer, president of the firm.

This program is planned to improve nearly every department in the plant. The important improvements will be: Additional chip making and screening capacity; an additional digester; the addition of a pulp blow tank, brown stock washers, and a digester heat recovery system; additional pulp screening capacity; a modern multi-stage pulp bleaching plant; a modern water treatment system for all boiler and process water used in the plant; additional waste liquor recovery equipment including a recovery furnace with waste heat boiler, an electrostatic precipitator for the recovery of salt cake from the flue gases, and additional causticizing equipment; the rebuilding of No. 1 paper machine to obtain higher speeds with the installation of a new drive, new wet presses and additional drying capacity; the installation of broke hydrapulpers to recover paper trim; and an additional rewinder for the manufacture of counter rolls.

All of the above improvements and betterments, it is expected, will bring the total daily capacity of the plant up to 225 tons instead of the 175 tons presently being produced. It will also result in a better quality of certain of the specialties now being produced and will enable the company to manufacture certain specialties that have not been produced in the past. This step in modernization will also insure better utilization of raw materials and increase productivity so that during periods of normal demand this plant will be in a superior position from a competitive standpoint. It is expected that these changes can be effected without interruption of production, with the exception of rebuilding the No. 1 paper machine. No estimate has been made as yet regarding the increase in employment that will result from this program.

F. S. Morgan, plant engineer, will be in charge of all engineering, under the general direction of Max R. Oberdorfer, executive vice-president and general manager.

According to an announcement by J. L. Ober, Scott Paper Co. vice-president in charge of manufacturing, three new plant managers have been appointed for the company's Chester, Pa. and Sandusky, Ohio plants and the Empire, Ore. plant of Coos Bay Pulp Corp., a Scott subsidiary. John W. McNichol (at left) will be in charge of the Chester plant. Richard Coffman (center) will be plant manager in Sandusky and Henry S. Godshall, Jr. (right) has been appointed manager of the Empire mill. Because of the great distance between the Empire plant and the other pulp mill of Coos Bay Pulp Corp. at Anacortes, Wash., Scott has decided to operate both mills as separate units rather than jointly as in the past.

WET LAP MACHINE FOR DOESKIN

EASTHAMPTON, MASS.—Doeskin Products Corp., Mt. Tom, announced that the corporation has purchased a new Rogers wet lap machine which is expected to increase the manufacture of wood pulp at the plant by ten tons a day.

STONE BUYS MOBILE MILL

MOBILE, ALA.—The title to the former Mobile Paper Mill Co. plant at Crichton, near Mobile, was transferred to the Stone Container Corp. in a deed filed January 3 in probate court here.

The property was sold by W. K. B. Potts, trustee for the Mobile Paper Mill Co., under appointment by the United States District Court.

The total price paid by the purchaser for the physical assets of the paper mill company has been estimated at $1,362,000.

The plant is now being operated by the Stone-Mann Paper Co. Inc., as a subsidiary of the Stone Container Corp. and the Seaboard Container Corp.

INDONESIAN PULP MILL

A group of Swedish wood pulp experts will visit Indonesia this year and bring with them Swedish machines and equipment for a wood pulp mill which, within a few years, is expected to make Indonesia independent as a producer of paper. The plant will take four years to complete and will cost between 40 and 50 million kronor. Preliminary negotiations for the delivery of machines, parts, etc., have been entered with the Karlstad Mechanical Works, in the province of Värmland.

FORM BRENNER PAPER STOCK CO

WINSTON-SALEM, N. C.—Capitalized at $100,000, Brenner Paper Stock Co., has just been organized here to carry on a business in paper, textile and chemical waste products. Morris Brenner, Abe Brenner and T. D. Carter, all of Winston-Salem, were listed as the incorporators.

Annual Meeting Program, Technical Section, Canadian Pulp and Paper Ass'n.

The 1951 annual meeting of the Technical Section, Canadian Pulp and Paper Assn., will be held in the Mount Royal hotel, Montreal, P. Q., on January 24, 25 and 26.

The program will cover all phases of pulp and paper manufacture, including subjects of interest to management and to operating personnel. The following is a list of some of the papers scheduled for presentation, together with the names of the authors:

"Some physical and chemical properties of high-yield kraft pulps" by J. Limerick and C. V. Callaghan, Bathurst Power & Paper Co., Ltd.

"Investigation of dirt from the wood pile to the finished product" by D. H. Baker, H. R. MacMillan Export Co., Ltd., D. Loyd, Pacific Mills Limited, H. R. Adams, Bloedel, Stewart & Welch Ltd.

"An evaluation of the chemical pulping equipment at the Pulp and Paper Research Institute of Canada" by J. S. Hart and R. K. Strapp, Pulp and Paper Research Institute of Canada.

"The use of centrifugal pumps in the paper industry" by B. R. Burland, The Canadian Blower & Forge Co. Ltd.

"Mechanics of the grinding process" by W. Boyd Campbell, Pulp and Paper Research Institute of Canada.

"Some speculations with regard to the bleaching of groundwood" by H. F. Lewis, The Institute of Paper Chemistry.

"The effect of process variables in the grinding of newsprint groundwood" by S. A. Collicutt, Powell River Co. Ltd.

"Operation of electronic-amplidyne controlled paper machine drive" by W. Eliason, The Ontario Paper Co. Ltd.

"Power distribution in paper mills" by C. F. Schmelzle, Abitibi Power & Paper Co. Ltd.

"Conversion from hydraulic to electric grinders" by Wm. Hall, Kimberly-Clark Corp. of Canada, Ltd.

"Wet-end ventilation of high speed news machines" by C. E. MacDonald, New Brunswick International Paper Co.

"Relationship of dryer hood design to machine room ventilation" by R. Willis, Ross Engineering of Canada Ltd.

"Dry-end ventilation at the Anglo-Canadian Pulp & Paper Mills" by J. Winn, Anglo-Canadian Pulp & Paper Mills Ltd.

"The effect of pulpstone grit distribution on groundwood quality control" by E. Walsh, Anglo-Newfoundland Development Co. Ltd.

"Quality control of groundwood" by T. G. Rust, The Ontario Paper Co. Ltd.

"Abrasive application in double-disk refining of groundwood rejects" by J. H. White, Keyes Fibre Co.

"A procedure for evaluating the printing qualities of newsprint" by G. L. Larocque, The News.

"Behaviour of press rolls" by F. A. Garrett, Canadian International Paper Co.

"The operation of anti-deflection top press rolls on newsprint machines" by D. R. Catford, Canadian International Paper Co.

"Is the Industry taking full advantage of possibilities available in process instrumentation?" by W. S. Yunker, The Foxboro Co.

"Automatic control of sulphur combustion by W. T. Butler, Abitibi Power & Paper Co. Ltd.

"A recovery method for sodium base sulphite liquor" by L. K. Bickell, B. C. Pulp & Paper Co. Ltd.

"The sulphite mill at Bowater's Newfoundland Pulp & Paper Mills Ltd." by L. Lang, H. Jamieson and A. Garland, Anglo-Newfoundland Pulp & Paper Mills Ltd.

"A discussion of the basic reaction in chemical pulping" by J. H. Ross, J. S. Hart, R. K. Strapp and W. Q. Yean, Pulp and Paper Research Institute of Canada.

"The chemical pulping laboratory of the Pulp and Paper Research Institute of Canada" by G. J. C. Potter, Pulp and Paper Research Institute of Canada.

"The influence of digester pressure" (on sulphite pulping) by J. S. Hart and R. K. Strapp.

"Ultra-violet analysis of liquor during the sulphite cook" by J. S. Hart, R. K. Strapp and P. Luner, Pulp and Paper Research Institute of Canada.

"Production of commercial-grade chemical pulps by the Pulp and Paper Research Institute of Canada" by J. S. Hart and R. K. Strapp, Pulp and Paper Research Institute of Canada.

"The application of radioactive tracers to measurement of fibre flow and distribution" by Dr. C. A. Sankey, The Ontario Paper Co. Ltd., Dr. S. G. Mason, Pulp and Paper Research Institute of Canada, Dr. G. A. Allen, Pulp and Paper Research Institute of Canada, and W. R. Keating, Quebec North Shore Paper Co. Ltd.

Each year the standing committees of the Section arrange informal discussions on various phases of activity in the industry. These have always been highly successful in the past, as shown by the enthusiasm and keen interest of the participants. The following are among the group discussions to be programmed at the annual meeting:

Alkaline Pulping

(1) Corrosion problems in alkaline pulping mills.
(2) Effect of excess alkali on paper and board machine operation.
(3) Importance of sulphidity control.
(4) Chip packing.
(5) Progress report on injection cooking at the Pulp and Paper Research Institute of Canada.
(6) Discussion of operating problems.

Board

(1) The use of the Howard Smith board creaser.
(2) Discussion of operating problems.
(3) Printing characteristics of calender-coated board.
(4) Pulp characteristics for paperboard.
(5) Surface oil resistance of paperboard.

Fine Papers

(1) Stock preparation.
(2) Consistency regulation.
(3) Discussion of replies to machine equipment questionnaire on rubber marking rolls.

Heat and Power

A general discussion of operating results obtained with different types of bark presses.

Mechanical Pulping

High energy grinding.

Newsprint

(1) Couch noise.
(2) Calender stack operation.
(3) Wire life.
(4) Drainage and formation.

Process Instrumentation

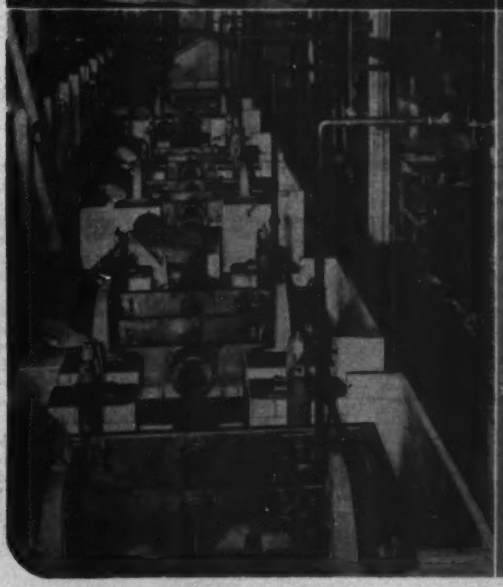
Discussion of paper by W. S. Yunker.

Other committees are also planning to hold group discussions, but arrangements are not yet finalized.

Reduced Fares for Members

Railway

Reduced railway fares can be obtained by members of the Technical



BIRD JONSSON SCREENS

get the dirt, knots, bark, shives, etc., right at the start before they get broken up in process.

They have the capacity—80 to 100 tons a day on sulphite, 150 or more on groundwood and kraft. They handle stocks of relatively high consistency—up to 1½% for sulphite, 2½% for groundwood and sulphate.

Jonsson Screens are now standard in scores of mills. Are you making the most of them?

BIRD MACHINE COMPANY
SOUTH WALPOLE • MASS.

PAPER MILL MEN'S CLUB OF SOUTHERN CALIFORNIA

Seated, retiring president Irvin E. Damon, now a member of the board of directors; president for 1951, Roland Wolf, Graham Paper Co. . . . Standing, left to right: L. A. Gardiner, Nekoosa-Edwards Paper Co., vice-president; C. J. Warren, Paper Container Mfg. Co., secretary; C. J. Fischer, Sherman Paper Products, treasurer . . . The officers were elected at a dinner meeting Dec. 8 at the Fox Hills Country Club, Los Angeles, preceded by golf and horse racing.

Section traveling from any point in Canada to the annual meeting. An identification certificate will be sent to all members, which will enable those attending the meeting to procure such reduced fares for themselves and their families by presenting the certificate when tickets are purchased. Details concerning allowable departure dates may be obtained from local ticket agents. A thirty-day return limit is placed on tickets purchased in this manner.

The identification certificates may be used when the going and returning routes are not the same. Details concerning this may be obtained from local passenger agents.

The reduced fares are applicable only in Canada. For delegates who are traveling from the United States and who wish to take advantage of the reduced fares on Canadian lines, Canadian railway tickets must be purchased on arrival in Canada. Reduced fares can then be obtained by presenting the identification certificates to a Canadian railway ticket agent.

T.C.A.

Similar arrangements for air travel have been completed under T.C.A.'s new Convention Tariff. However, in this case *members must write to the Section* for identification certificates. T.C.A.'s plan differs slightly from that of the railways in that reductions apply on both one-way and round-trip tickets. The one-way fare is reduced to 90 percent of the normal one-way fare and round-trip tickets to 160 percent of the normal one-way fare. There is a four-month return limit on round-trip tickets, and stopovers are permitted. As with the railways, the reduced fares are only available for travel within Canada.

Wood Supply

The American Forest Products Industries, Inc., is to be congratulated on their new booklet, "The Nation's Wood Supply." Nowhere have we seen this subject so well presented. Far from being a prophecy of gloom, it gives the record of achievement by private enterprise, government, and professional foresters.

It is hoped that "The Nation's Wood Supply" will have a wide distribution among the schools, legislatures, and all others concerned with the forests, whether they earn their living, or derive their enjoyment therefrom.

WESTERN CPPA ELECTIONS

At the annual meeting of the Western Branch, Canadian Pulp and Paper Assn., Vancouver, Logan Mayhew was elected chairman of the executive committee for the year ending December 31, 1951. G. D. Humphrey was elected vice-chairman. Mr. Mayhew is vice-president of Sidney Roofing & Paper Co., Ltd., of Victoria and Vancouver and Mr. Humphrey is assistant manager, British Columbia Pulp and Paper Co., Ltd., with rayon pulp mills at Woodfibre and Port Alice. The executive committee comprises the following: Paul E. Cooper — immediate past chairman, Prentice Bloedel, Clifford Crispin, H. S. Foley, M. J. Foley, E. M. Herb, B. M. Hoffmeister, A. C. Kennedy, Lawrence Killam, R. S. Laird, J. Petrie, J. G. Prentice, D. G. Stenstrom, H. D. Todd, J. A. Young, R. H. R. Young, Leander Manley, secretary manager.

RITTER RETIRES FROM FPL

MADISON, Wis. — After 30 years of fundamental research that, among other things, laid the groundwork for much of our modern paper and plastic industries, Dr. George J. Ritter has retired, effective December 31, 1950, from his position as a chemist at the U. S. Forest Products Laboratory here.

Dr. Ritter, a native of Appleton, Wis., came to the Forest Products Laboratory on July 1, 1920.

FIGHTING PAPER WANTED

Invitation to bid has been issued by the New York Quartermaster Procurement Agency, 111 East 16th Street, New York 3, N. Y., on QM-30-280-51-1070, covering Paper, Blotting, Desk. Chemical wood, unsized, substance 100 (various colors), size 19" x 24", 108,-500 sheets; Paper, Carbon (various), 107,750 boxes; Paper, Tape, Cash Register, width 2½", 500 rolls; Paper, Computing Machine. Chemical wood, substance 16-225 feet per roll, 31,500 rolls; and Paper, Cross Section (graph), Drawing. Chemical wood, substance 16, 50 sheets per pad, 1,000 each; and Paper, Cross Section (graph), Drawing. Chemical wood. substance 16, 50 yards per roll, 2,700 rolls.

Bids will be opened January 25, 1951, at 11:00 a.m. (EST) at the New York office. Delivery schedule: To be completed by February 28, 1951. This procurement is for the U. S. Navy.

QM-30-280-51-1004, covering Paper, Map, Lithographic Finish, Sulphite, White, substance 40, size 19x20",—12,-000 reams. Bids will be opened January 15, 1951, at 2:00 p.m. (EST) at the New York office. Delivery schedule: Completed before June 30, 1951. This procurement is for the U. S. Army.

Duplicating, Copy, Liquid Process, Chemical Wood, Substance 20 (Various), 375,750 reams. Bids will be opened January 15, 1951, at 1:00 P.M. (EST) at the New York Office. Delivery Schedule: May 31, 1951. This procurement is for the U. S. Navy.

QM-30-280-51-1011, covering Folders, Service, Chapel (100 Per Package), 277,500 each. Bids will be opened January 15, 1951, at 3:00 P.M. (EST) at the New York Office. Delivery Schedule: Completed by March 31, 1951. This procurement is for the U. S. Air Force.

measure for measure....

...Niagara packs quality. This quality is the result of long experience, persistent research, superior raw materials and careful control of every phase of processing.

- EBG* Liquid Chlorine
- NIALK* Caustic Potash
- NIALK Carbonate of Potash
- NIALK Paradichlorobenzene
- NIALK Caustic Soda
- NIALK TRICHLORethylene
- NIAGATHAL* (Tetrachloro Phthalic Anhydride)

*Trade-mark

NIAGARA ALKALI COMPANY

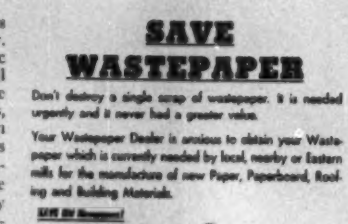
60 East 42nd Street, New York 17, New York

The Time Has Come

The public must be told that it is vitally important to save waste paper. Experience has been that, if the public is told of the need, the people will respond heartily. But they must be told over and over again. Dealers, packers and mills should cooperate in giving this message to the public, says Colley S. Baker, director, Eastern Conservation Committee. If every waste paper dealer and packer, and every consuming mill in its own local territory tells the public through the mediums of newspaper and radio advertising — and television, too, if available — of the great need for saving waste paper, there will be no shortage this winter.

The New Year opens with a continued demand for waste paper of every grade. Everything possible should be done by waste paper dealers and packers as well as the consuming mills, to maintain collections on the high level established during last month. Special emphasis should be placed on the collection of old corrugated boxes at this time because in the post-holiday clean-up of the stores and industries more of them will be available than perhaps any other time during the winter. Present consumption of old corrugated is on a higher level at the present time than during either 1947 or 1948. However, there are more boxes available for collection now than then. It should not be difficult to collect them now.

By placing special emphasis on old


SAVE
WASTEPAPER
Don't destroy a single scrap of wastepaper. It is needed urgently and it never had a greater value.
Your Wastepaper Dealer is anxious to obtain your Waste-paper which is currently needed by local, nearby or Eastern mills for the manufacture of new Paper, Paperboard, Roofing and Building Materials.
Sell All Clean Wastepaper to a Local Wastepaper Dealer
or Give It to a Local Collecting Charity
Call
[Name and Address of Dealer]
Telephone

cartons and boxes, we do not mean that any other grade of waste paper is less important today. All clean wastepaper, well sorted and well packed, is urgently needed by the consuming mills. But right now there is more old corrugated available for collection, and every pound of it should be collected.

We are unable to forecast what this Emergency Year will bring forth. Let us hope that it will bring us peace and prosperity. But we do know that it will be a year of preparedness, a year in which the defenses of this country will be strengthened. And as the need for more paper, paperboard, roofing and building materials increases, so will the requirements for more waste paper continue.

At the present time, waste paper dealers and packers have available manpower and available equipment to continue to do the great job that they performed during the closing months of last year. Just how long they will have this manpower is difficult to say, but they should prepare at once for any emergency that may arise. Now, of all times, is the time to collect waste paper. It is more plentiful now than ever before; its collections is easier, and those who collect it never were better paid.

To meet the needs of the dealers and mills, ECC has prepared (1) a new advertisement to be inserted in local newspapers, and (2) a publicity release to be given to the editors of local newspapers. The name of one or more waste paper dealers, with addresses and telephone numbers, should be inserted in each advertisement. The advertisement is written so that it may occupy any size space from 5 inches by two columns to a half page. It should be published in your local newspapers once, twice or three times each week. Additional copies of this advertisement are available on request to Eastern Conservation Committee of the Wastepaper Consuming Industries, 370 Lexington Avenue, New York 17, N.Y.

DEODORIZING PILOT PLANT

Efforts of the B. C. Research Council are being directed to overcoming objectionable odors from pulp mills. British Columbia has been facing the problem of effective utilization of a greater percentage of raw materials from its forests. One answer lies in the conversion of sawmill scrap to kraft pulp. With this thought in mind, Bloedel, Stewart & Welch Ltd. and the H. R. MacMillan Export Co., during the past few years, opened mills at Port Alberni and near Nanaimo respectively. Both companies made a generous contribution to the work of the B. C. Research Council in combating odors. Eastern concerns, also faced with the problem, have contributed additional sums.

To date the efforts of the Council have resulted in a successful elimination of odors on a laboratory scale. Work will start in the immediate future on the construction of a pilot scale model of the deodorizing plant which will test the efficiency of methods suggested by recent research.

It is not expected that the odors will be completely eliminated, but research officials are confident that the investigation will provide a marked reduction in the amounts of objectionable gases which emanate from kraft mills.

MARATHON'S CHLORINE PLANT

The Marathon Paper Mills of Canada, Ltd., have announced that they will build a twenty-five daily ton chlorine plant at their Marathon, Ont., mill. This is the first commercial installation of De Nora mercury cells in North America. The thirty thousand ampere cells will receive d.c. power from I. T. E. Circuit Breaker Co. mechanical rectifiers. The design of the plant is such that either rayon grade caustic or sodium sulfide can be manufactured in any proportion equivalent to the chlorine production. Hence, complete integration with pulp mill operation will be obtained and no excess caustic will be available for sales. The project engineers for Marathon are R. B. MacMullin Associates of Niagara Falls, N.Y. The prime contractor and licensor of the De Nora process is Monsanto Chemical Co., St. Louis, Mo., and the constructor is Leonard Construction Co., Chicago, Ill. The licensor for the sodium sulfide process is Luigi Achille, Milan, Italy.

USE UREA FORMALDEHYDE

WASHINGTON — A recommendation that V-board manufacturers convert to use of urea formaldehyde and starch adhesives as a conservation measure to save polyvinyl alcohol, which is in critical supply, was made to National Production Authority this week by the polyvinyl alcohol industry advisory group.

It was pointed out that although V-board is today absorbing a substantial part of the available polyvinyl alcohol supply, the proposed substitutes were initially used in V-board production. As it is, the industry spokesmen said, the entire polyvinyl alcohol supply is being used by DO rated defense orders alone, leaving a problem for ordinary civilian users.

Guard against dryer roll bearing failure

with GULF HARMONY OIL

—retains its lubricating value at high operating temperatures

Here's effective protection for dryer roll bearings under severe operating conditions—Gulf Harmony Oil. It's ideal for roller bearings, for example, when exposed to high temperatures—retains its high lubricating value, protects against pitting and premature failure.

Gulf Harmony Oil is equally effective for sleeve-type bearings—prevents failures when operating at low speeds, as when starting or stopping. And bearings stay exceptionally clean with Gulf Harmony Oil because of its outstanding resistance to oxidation.

Gulf Harmony Oil has been fortified to provide an even more effective rust preventive film. Now you can be sure that all oil bathed surfaces get safe, sure protection against harmful rust.

We suggest you consult with a Gulf Lubrication Engineer about this outstanding oil. He will be glad to give you complete details without obligation. Write, wire, or phone your nearest Gulf office today. Gulf Oil Corporation · Gulf Refining Company, Gulf Building, Pittsburgh, Pa.

FIFTY YEARS OF SERVICE
1901 GULF 1951
PETROLEUM AND ITS PRODUCTS

Viscosity

NEIL MAC COULL[1]

(Continued from January 5, 1951, issue)

PART IV—Effects of Temperature and Pressure

A. Temperature

The rate of change of the viscosity of a fluid with temperature, is not easily solved by formula and it has been found convenient to interpolate or extrapolate test data by means of charts. These temperature-viscosity relationships have such pronounced curvature that plots on rectangular coordinates are not satisfactory if they cover considerable range, because the viscosities at the high temperature side of the plot cannot be read with sufficient accuracy.

Several other ways of plotting these data have therefore been proposed. One of the first which naturally suggested itself was the use of logarithmic coordinates with the viscosity scale in centistokes. When the temperatures were expressed in Fahrenheit or Centigrade an improved chart resulted, as may be seen from *Figure 21* which was published in the July 1920 issue of *Lubrication*. Curves for various oils became straight enough in their center part for reasonable interpolation, although they were curved slightly at the ends, in opposite directions. The viscosity scale was sufficiently open to read with about equal accuracy at all points. The principal weaknesses of this chart were: First, the temptation to extrapolate the straight part of these curves (especially when data are not plotted above 210°F.), which has led to the astonishing conjecture that all oils have the same viscosity at some temperature where the extended straight parts of these graphs coincide. Second, the graphs cannot be used at 0 degrees or below. This latter fault was corrected by changing to a scale of absolute temperature instead of Fahrenheit, but the lines for various oils again became so decidedly curved that interpolation was uncertain.

The next step was an attempt to straighten these lines again by taking the log of the ordinate scale a second time, in other words, the log of the logarithm of the viscosity. The result was a series of lines for various oils which were surprisingly straight down to about 4 cs (40 sec Saybolt) and almost parallel for oils from similar crudes. Below 4 cs these lines began to curve downward. Furthermore, since there is no real logarithm of a negative number, it was not possible to obtain the log log of a number less than 1.0 cs. This chart was cut off at 40 seconds Saybolt and published in the June 1921 issue of *Lubrication* (*Figure 22*). Its decided usefulness immediately became evident. Many thousands of these charts were copyrighted and distributed by The Texas Company and used in industry. One of the significant indications of the value of this chart, which showed its need in industry, was the considerable number of similar charts which later were evolved both in this country and abroad. Possibly one reason for this competition was the unintended mystery surrounding this chart as a result of withholding the empiric formula on which it was based, pending an anticipated improvement to reduce the restrictions at low viscosities already mentioned.

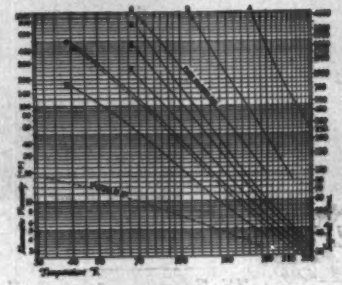


Figure 21—Chart laid out on Log CS Versus Log F from Lubrication, July, 1920.

In an attempt to extend the viscosity scale below 1 cs, a constant of 1.0 was added arbitrarily to the viscosity in cs before taking the log of its logarithm. This effected a marked reduction in the curvature of the graphs in their low viscosity regions, and even appeared to be a little too much correction, since the viscosity lines tended to become slightly concave upward where they had previously been curved

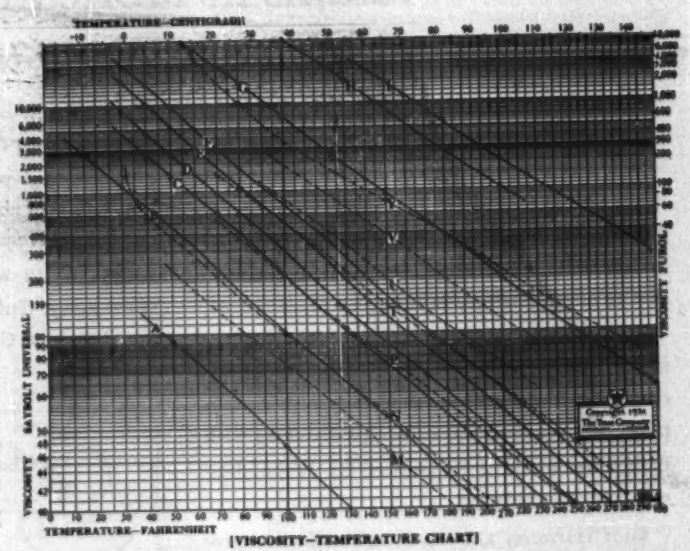


Figure 22—Chart laid out on Log-Log of CS Versus Log Abs. Temperature (°F.). From *Lubrication*, June, 1921. Oils coded A to I are of Naphthenic type. Oils coded M to Y are Paraffinic. Note effect of wax crystallization at low-temperature end of oils N and Y.

[1] Published with permission of the Texas Co.
[1] Technical and Research Div., The Texas Co., Beacon, N. Y.

[10] F. W. Lane and E. W. Dean—Ind. and Eng. Chem. *16*, p. 903, 1924. Viscosities were tabulated at 10° C. intervals on 12 or more fractions cut over the same temperature ranges, from 5 widely different crude oils.

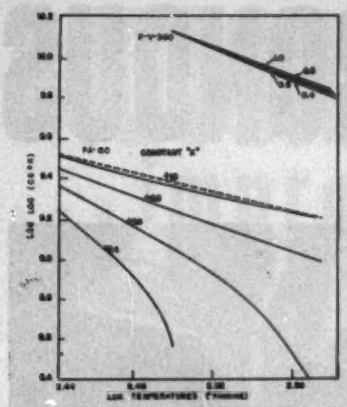


Figure 23—Effect of various constants on the curvature and slope of viscosity-temperature curves.

downward. This led to trial of smaller constants than 1.0.

The results of varying this constant may be seen in *Figure 23* in which high and low viscosity cuts from the same samples of crude oils are plotted from Lane and Dean's remarkably comprehensive data,[15] with constants varying from 1.0 down to 0.4. On the high viscosity fraction (P-V-300), the negligible effect of varying this constant on the straightness of the lines and the slight effect on their slopes, is evident. On the low viscosity fraction (PA 150), the importance of the constant is obvious. As a result of this study, a constant of 0.7 was considered to give the best overall results, and was adopted for several charts, including one which was published in the 1927 International Critical Tables. This chart, together with all the points from Lane and Dean's data for fractions from the California crude, is shown in *Figure 25*.

Similar work sheets were made for the four other crude oil sources, and all demonstrated an equally remarkable family of straight and almost parallel lines down to at least 0.7 cs. A further study of these results is indicated in *Figure 24* which shows the mean slope* for each cut from each crude[15] plotted against the viscosity of that cut at 212°F. Dot-and-dash lines connect cuts of all crudes which were made in the same temperature range. The uniform slope, and the resulting parallelism of the plots for the lubricating oil fractions from the Gulf Coast crude is noteworthy. So is the uniform increase of slope for the Pennsylvania crude cuts with decreasing viscosity, and the approach to each other of the slopes of cuts from all crudes at viscosities below about 1 cs. The effect of using a constant of 0.8 instead of 0.7 is indicated by the dotted curves for the Gulf Coast and Pennsylvania crudes.

As a result of this study, 0.7 was the value of the "viscosity constant" reported to the ASTM when the general form of equation** was disclosed[16] to the committee assigned to standardize viscosity-temperature charts. A constant of 0.8 appeared preferable to the committee, and was adopted for the first ASTM charts.[17] By 1937 further study resulted in a revision of the ASTM charts to use a constant of 0.6 down to viscosities of 1.5 cs and an increased constant of 0.65 for the viscosity range from 1.5—1.0 cs; 0.70 for 1.0—0.7 cs and 0.75 for 0.7—0.4 cs.

The slope of the low viscosity coordinate lines is due to the fact that they are drawn as equivalent Saybolt viscosities, which requires a temperature correction for conversion to kinematic viscosity, due to the cooling of oil as it flows from the Saybolt tube into its measuring flask. The chart, of course, is actually laid out on the basis of kinematic viscosity, even though

* The slopes indicated are those obtained mathematically, by dividing the differences between the log of the log of the viscosity (in cs) + 0.7, of any two points for a given oil fraction, by the differences in logs of the absolute temperatures (in degrees Rankin) at those two points.

** log log (sc + K) = —b log (temp. in ° Rankin) + a.

[15] Letter of 19 May 1931.

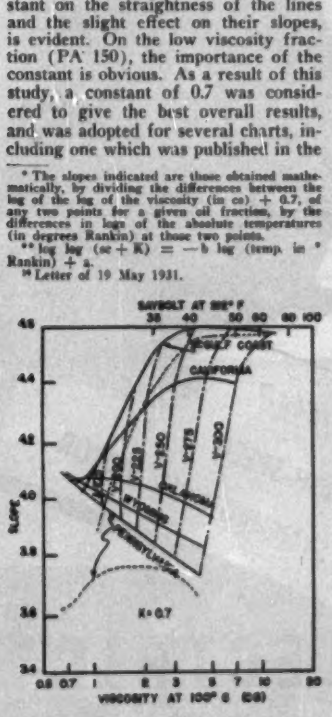
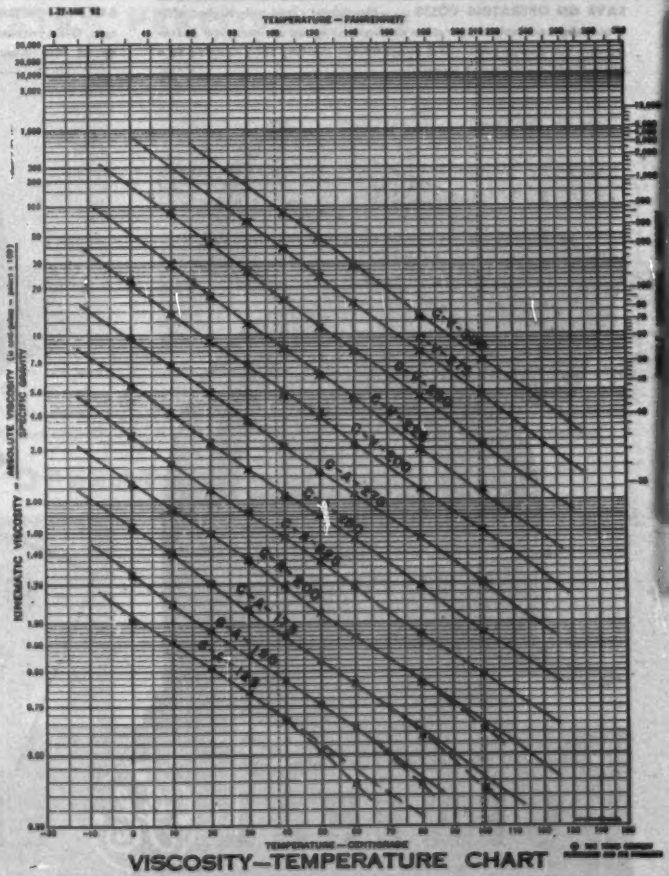


Figure 24—Slope of various cuts from different crudes as affected by their viscosity.



VISCOSITY—TEMPERATURE CHART

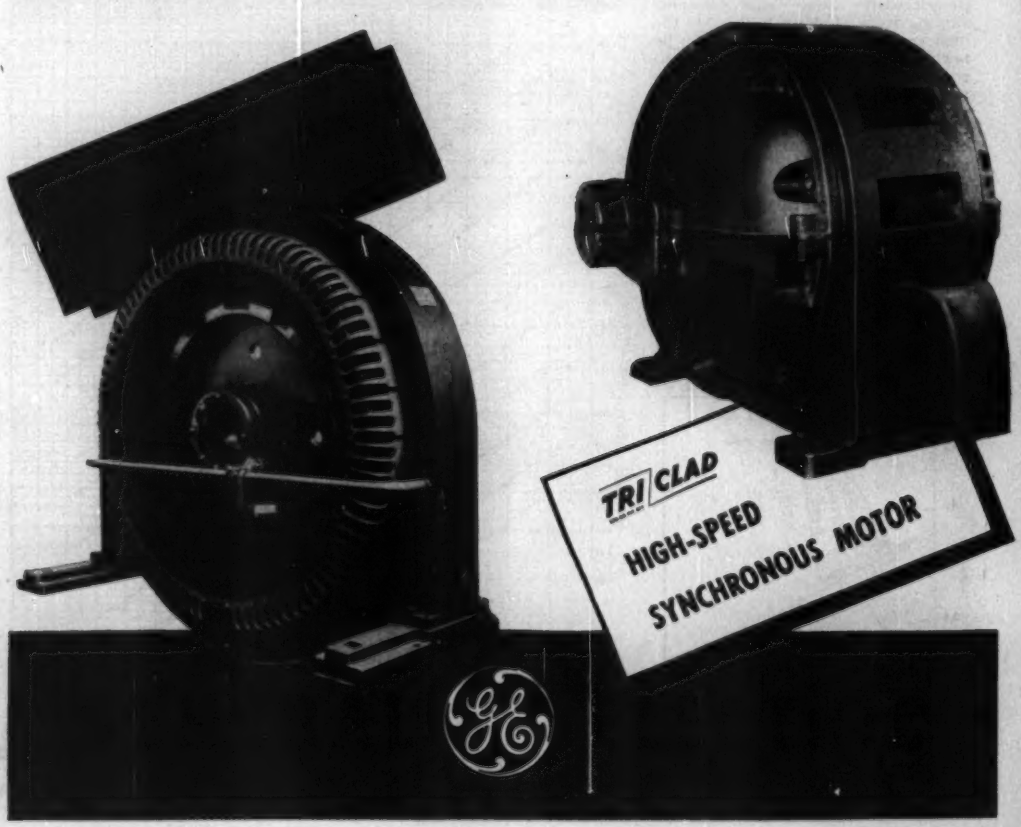
Figure 25—Proof of the straight-line characteristic of the log-log chart (with an 0.7 constant) from 12 cuts of a California crude. (Lane & Dean's Data.)

G-E SYNCHRONOUS

SAVE MONEY

SAVE ON OPERATING COSTS . . . Municipal plant gets higher efficiency by continuous operation at constant speed of three 500 horsepower, 1.0 power factor, G-E synchronous motors, each coupled to a centrifugal storm-sewer pump.

SAVE ON INITIAL COST . . . Paper mill selected this 4000 hp, 200 rpm, G-E synchronous motor for driving the montagne grinders at low speed. Maximum operating efficiency thus resulted.



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. . . improve performance

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Lower operating costs higher operating efficiency

Lower initial cost including control and exciter—for many ratings

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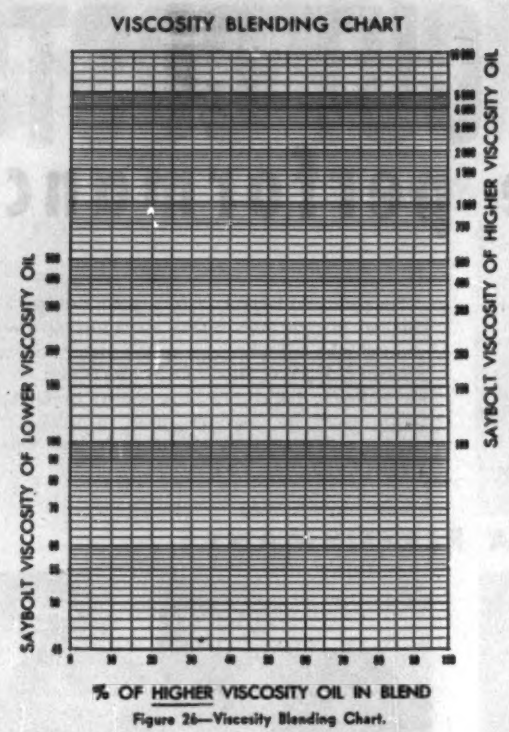
VISCOSITY BLENDING CHART
SAYBOLT VISCOSITY OF LOWER VISCOSITY OIL
SAYBOLT VISCOSITY OF HIGHER VISCOSITY OIL
% OF HIGHER VISCOSITY OIL IN BLEND

Figure 26—Viscosity Blending Chart.

only the equivalent Saybolt scale is indicated.

The original work on this chart which led to the plotting of straight lines by adding a constant to the viscosity before taking its log-log, is credited to MacCoull by the original ASTM Report.[17] The first log-log chart was published in *Lubrication* in 1921. Walther did some similar work in Germany (but without the added constant) in 1928[18] in which he referred to the use of a double logarithmic scale which he credited to Le Chatelier.[19]

In 1929 Walther wrote that he had been advised of The Texas Company's chart by Herschel of the U. S. Bureau of Standards[20] and implied that this chart had been worked out on a graphical basis. As a matter of fact, it was Herschel who had developed this graphical method.[21]

It was not until August, 1931 that Walther first published the constant in a log-log formula.[22] This is an interesting point since some physicists abroad have described the use of the log-log of viscosity plus 0.8 as "Walther's formula," [23 24] in technical publications, apparently being unaware of the prior use of this formula by The Texas Company.

B. Viscosity Blending Chart (Figure 26)

Early in the use of these charts, it was found that they were useful also, in approximating the viscosity of lubricating oil blends. The section between 0 and 100°F. was arbitrarily taken as a scale indicating the percentage of the *high* viscosity oil in a blend, the viscosity of which was marked at the suitable ordinate on the 100 line. The viscosity of the lower viscosity oil (at the same temperature) was indicated on the 0 line. A straight line plotted between these two points indicated the viscosities of mixtures of these two oils according to the scale which indicated the percentage of the high viscosity oil in the blend. This blending method was published at a later date[25] together with one of the first descriptions of The Texas Company's chart to be published outside of *Lubrication*. More recently charts have become available with a linear percentage scale, but they do not appear to be quite as accurate. It should be borne in mind that any chart is at best but a close approximation with the discrepancy increasing with the difference in viscosity of the two oils being blended.[26]

C. Effect of Temperature on Viscosity of Gases

Before leaving the effect of temperature on the viscosity of liquids, it will be of interest to note that temperature has an opposite effect on the viscosities of gases. While the viscosity of any liquid decreases with increasing temperatures, the viscosity of gases increases. Similar principles are used for the measurement of the viscosity of a gas as for a liquid, and some ingenious capillary tube instruments have been devised for this purpose in which the gas flow is accomplished by the fall of a small pellet of mercury in a connecting tube.[27] To give an idea of the relative magnitudes of the viscosities of gases, *Table I* has been prepared.

TABLE I

VISCOSITIES OF SEVERAL GASES AT 20° C. AND 1 ATM. PRESSURE

Gas	Viscosity in cp.
Hydrogen	0.009
Helium	0.020
Carbon Dioxide	0.015
Air	0.018
Mercury Vapor at 273° F.	0.049

Because of the low values of gas viscosities, they are often expressed in terms of *micropoises*. Such units result in values 10,000 times as large as the centipoise values shown above.

While the viscosities of gases are obviously low, they may produce considerable drag on high speed machinery such as large electric generators, steam turbine rotors, centrifugal blowers, etc. Progress seems to be associated with continually increasing speeds of mechanisms, and viscous drag or "windage" of air may thus become increasingly important.

D. Effect of Pressure on Viscosity of Liquids

For some time it has been known that the viscosity of oil increases with pressure. This is, of course, a matter of importance in analyzing the hydraulics of oil performance in heavily loaded bearings. Because it is difficult to measure viscosities at very high pressures, the amount of such data is limited. Several research groups have been making studies of this subject, but for this article the general effect of pressure may be seen from *Figure 27*.[28] Mineral oils represented by the curves coded A to D, increased considerably in viscosity with pressure, and as a group, varied much more than the fatty oils, which fell in a separate group. As a contrast, water exhibited but little of this characteristic.

A comprehensive investigation of

[17] API Proc. Div. of Refining, June 1932, p. 56.
[18] Erdöl und Teer 4, p. 510, 1928.
[19] Comptes Rendus des Seances de L'Academie des Sciences, Vol. 179 (1924), p. 518. M. Le Chatelier proposed the simple log-log scale for use of molten glass only.
[20] Erdöl und Teer 5, p. 619, 1929.
[21] Oil and Gas Journal, Dec. 2, 1926, pp. 146-182.
[22] Erdöl und Teer 7, 382-4, Aug. 25, 1931, p. 383—footnote (9): "Für die Zurverfügungstellung von entsprechenden Diagrammen und Viskositätswerten ist der Verfasser Herrn Dr. Herschel vom Bureau of Standards, Washington, zu Dank verpflichtet."
[23] Inst. of Mechanical Engineers Proc., 1937, p. 218-20.
[24] The Science of Petroleum, Vol. II (1938), p. 1087.
[25] Oil & Gas News, June 1924, p. 18, Dr. Roy Cross, "Viscosity Chart for Mineral Oils, and How to Use It."
[26] Technologic Papers—Bureau of Standards No. 164 (1920).
[27] The Viscosity of Gases at High Pressures. U. of Ill. Bul. Ser. No. 354 (1944), p. 19.
[28] Reproduced from "Lubrication," April 1921, p. 11.

this subject has been under way since 1948 at Harvard University sponsored by a committee of the ASME. They have developed a viscometer which is fundamentally similar to that shown in *Figure 6*. Instead of a ball, a short cylindrical "sinker" is used. The tube, of course, is made of steel to withstand high pressures and the fall of the sinker when the tube is inverted is indicated by means of electrical contacts. Publication of the work of this committee at an early date will be awaited with interest.

PART V—Viscosity Index

It is frequently desirable to indicate in some simple terminology the relative rate of change of viscosity of a given oil with temperature. A system called Viscosity Index was introduced by E. W. Dean and G. H. B. Davis[20] for this purpose, and it has served so well that it is now in wide use.

The original viscosity index system was set up by an arbitrary selection of two series of oils derived from opposite extreme types of crude oil: the "H" series having the less change in viscosity with temperature, and the "L" series the greater change. Seven blends were made up in each series with viscosities varying from about 200 to 1200 seconds Saybolt at 100°F. Each oil in the "H" series was arbitrarily assigned a V.I. value of 100, whereas each oil in the "L" series was assigned a V.I. value of 0. In practice a reference oil is selected from each series, with the same viscosity at 210 as an oil to be evaluated. The numerical difference in viscosities of these two oils at 100°F. will always, by definition, represent 100 V.I. divisions. Thus the V.I. of an oil may be computed by equation 19 below.

Such calculations are generally simplified by means of tables, such as *Table II*.

In use, the table is entered at the 210° viscosity of an oil to be evaluated, and the 100°F. viscosities of the L series, as well as the difference in the 100°F. viscosities of the L and H series (oils having the same 210°F.

$$\frac{\text{V. I.}}{100} = \frac{\text{difference between 100° F. viscosities of L Series and unknown oil}}{\text{difference between 100° F. viscosities of L and H Series oils}} \qquad (19)$$

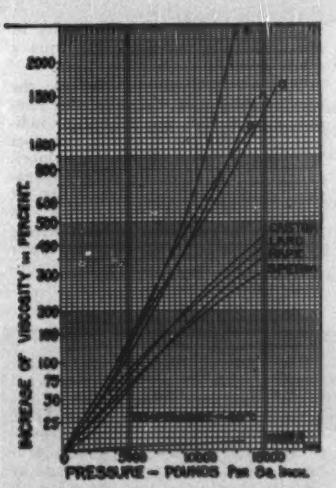

Figure 27—Showing the effect of pressure on viscosity. The group of fatty oils is much less affected than the mineral oils represented by lines A to D. Notice that water is affected but little.

[20] Chem. & Met. Eng. 36, No. 10, p. 618 (1929).

TABLE II

ABRIDGED V.I. TABLE FOR SAYBOLT VISCOSITIES

(ASTM D 567-41)

H = Viscosity at 100 F. of an oil of 100 viscosity index.
L = Viscosity at 100 F. of an oil of 0 viscosity index.

Saybolt Universal Viscosity at 210 F., sec.	H	L	D (L — H)	Saybolt Universal Viscosity at 210 F., sec.	H	L	D (L — H)
40.0	107.1	137.9	30.8	72.5	651	1290	639
40.5	113.1	147.3	34.2	73.0	660	1311	651
41.0	119.3	157.9	38.6	73.5	669	1333	664
41.5	125.9	169.4	43.5	74.0	678	1355	677
42.0	132.7	181.7	49.0	74.5	688	1377	689
42.5	139.7	194.7	55.0	75.0	697	1399	702
43.0	146.9	208.4	61.5	75.5	707	1422	715
43.5	154.2	222.4	68.2	76.0	716	1444	728
44.0	161.5	236.5	75.0	76.5	725	1468	743
44.5	168.9	250.9	82.0	77.0	734	1489	755
45.0	176.3	265.1	88.8	77.5	744	1512	768
45.5	183.8	279.4	95.6	78.0	753	1534	781
46.0	191.3	293.9	102.6	78.5	763	1557	794
46.5	198.7	308.2	109.5	79.0	772	1580	808
47.0	206.2	322.4	116.2	79.5	782	1604	822
47.5	214.0	337.0	123.0	80.0	791	1627	836
48.0	222.0	352.3	130.3	80.5	801	1651	850
48.5	230.3	368.5	138.2	81.0	810	1674	864
49.0	239.0	386.2	147.2	81.5	820	1698	878
49.5	247.2	404.2	157.0	82.0	829	1721	892
50.0	255.1	422.0	166.9	82.5	839	1745	906
50.5	263.4	439.2	175.8	83.0	849	1769	920
51.0	271.7	456.1	184.4	83.5	859	1793	934
51.5	280.0	473.1	193.1	84.0	868	1817	949
52.0	288.4	490.5	202.1	84.5	878	1841	963
52.5	296.8	507.7	210.9	85.0	888	1865	977
53.0	305.3	525.2	219.9	85.5	898	1890	992
53.5	313.8	543.0	229.2	86.0	907	1914	1007
54.0	322.2	560.5	238.3	86.5	917	1939	1022
54.5	330.7	578.1	247.4	87.0	927	1964	1037
55.0	339.2	596.0	256.8	87.5	937	1989	1052
55.5	347.8	614.1	266.3	88.0	947	2014	1067
56.0	356.4	632.3	275.9	88.5	957	2039	1082
56.5	364.9	650.2	285.3	89.0	966	2064	1098
57.0	373.5	668.6	295.1	89.5	976	2090	1114
57.5	382.2	687.0	304.8	90.0	986	2115	1129
58.0	390.8	705.5	314.7	90.5	996	2141	1145
58.5	399.4	723.9	324.5	91.0	1006	2166	1160
59.0	408.2	742.8	334.6	91.5	1016	2192	1176
59.5	416.9	761.7	344.8	92.0	1026	2217	1191
60.0	425.6	780.6	355.0	92.5	1036	2244	1208
60.5	434.3	799.7	365.4	93.0	1046	2270	1224
61.0	443.1	818.9	375.8	93.5	1056	2296	1240
61.5	451.9	838.1	386.2	94.0	1066	2322	1256
62.0	460.6	857.4	396.8	94.5	1077	2349	1272
62.5	469.5	876.9	407.4	95.0	1087	2375	1288
63.0	478.4	896.5	418.1	95.5	1097	2402	1305
63.5	487.2	916.2	429.0	96.0	1107	2428	1321
64.0	496.1	936.2	440.1	96.5	1118	2455	1337
64.5	505.0	955.9	450.9	97.0	1128	2481	1353
65.0	514.0	976.1	462.1	97.5	1138	2509	1371
65.5	522.9	996.2	473.3	98.0	1148	2536	1388
66.0	531.8	1016.3	484.5	98.5	1158	2564	1406
66.5	540.8	1036.7	495.9	99.0	1168	2591	1423
67.0	549.8	1057.1	507.3	99.5	1179	2619	1440
67.5	558.9	1077.7	518.8	100.0	1189	2646	1457
68.0	567.8	1098.3	530.5	101.0	1210	2701	1491
68.5	577.0	1119.2	542.2	102.0	1231	2757	1526
69.0	586.1	1140.1	554.0	103.0	1252	2814	1562
69.5	595.2	1161.2	565.9	104.0	1273	2870	1597
70.0	604	1182	578	105.0	1294	2928	1634
70.5	614	1204	590	106.0	1315	2985	1670
71.0	623	1225	602	107.0	1337	3043	1706
71.5	632	1247	615	108.0	1358	3102	1744
72.0	641	1268	627	109.0	1379	3161	1782

viscosity as the oil being evaluated) are both taken for use in equation 19.

Thus: the oil designated "PR" in Lane and Dean's data had a viscosity of 80 at 210°F and 800 at 100°F. The V.I. is therefore:

$$\frac{1627 - 800}{836} \times 100 = 99$$

where 1627 is the viscosity at 100°F of reference oil of 0 V.I. having the same 210°F viscosity as the oil being evaluated. 836 is the difference between the 100°F viscosities of the 0 and 100 V.I. oils.

0 to 100 Not the Confining Limits

While it was probably assumed originally that the V.I. of all oils would fall between the L and H series, some oils are now in use which are less sensitive to temperature than the 100 V.I. series, and others are more sensitive than the zero V.I. series.

Thus Viscosity Indexes over 100 are experienced as well as less than 0; in other words, negative values. For example, the sample designated "T-V-275" from the same source,[18] had a viscosity of 49 at 210 and 460 at 100°.

The V.I. is consequently

$$\frac{386.2 - 460}{147.2} \times 100 = -50.2$$

Relation to Kinematic Scale

With the trend in the petroleum industry to measure all viscosities in Kinematic units, tables are now used which indicate V.I. of an oil directly, and without calculation, from the viscosities in centistokes at 100° and 210°F. A sample page from one of these tables is shown in *Table III*. This page would be used to evaluate an oil having a viscosity in the range from 5.65—5.69 cs at 210°F and V.I. in the range from 60 to 120. To evaluate an oil of 5.66 cs at 210°F and 40 cs at 100°F., run down the column headed 5.66 to 40.00, where it will be seen that the V.I. is 84.

For those who prefer graphical solutions a chart such as *Figure 28* may be used. This was taken from the original article by Dean and Davis.[29] An example for its use may be indicated by assuming an oil with a viscosity of 110 sec. at 210°F. and 2500 sec. at 100°F. Enter the chart along the diagonal line marked 110 at the top, and follow down the diagonal line until it intersects the light vertical line rising from 2500 at the bottom. Follow this intersection horizontally to the scale at the left, where it will be found to have a Viscosity Index of 40.

Such a system as this for relating the viscosity sensitivity of an oil to temperature changes, between two extreme types of arbitrarily selected crudes, might appear to indicate the source of the crude oil from which it was derived. This, however, is not the case since oil refining today may change the V.I. of an oil to a far different value than would normally be expected from unrefined oils from a given crude.

V.I. has only one significance; the rate of change of viscosity with temperature. It does not define nor indicate any other characteristic, nor does it measure the quality of the lubricating oil. In fact, in some applications, such as turbine lubrication, it may be preferable to use low V.I. oils so as to take advantage of relatively high viscosities on starting and lower viscosities as the oil warms up to running temperatures.

TABLE III

SAMPLE PAGE FROM V.I. TABLES FOR BASIC KINEMATIC VISCOSITIES (COMPILED BY THE TEXAS COMPANY)

	Kinematic Viscosity at 210° F.									
	5.65		5.66		5.67		5.68		5.69	
V.I.	KIN. at 100°	KIN. at 150°	KIN. at 100°	KIN. at 150°	KIN. at 100°	KIN. at 150°	KIN. at 100°	KIN. at 150°	KIN. at 100°	KIN. at 150°
60	44.32	14.07	44.47	14.10	44.61	14.13	44.75	14.17	44.90	14.20
61	44.14	14.04	44.28	14.08	44.42	14.11	44.57	14.15	44.71	14.18
62	43.95	14.02	44.10	14.06	44.24	14.09	44.38	14.12	44.52	14.16
63	43.77	14.00	43.91	14.03	44.05	14.07	44.19	14.10	44.33	14.13
64	43.58	13.98	43.72	14.01	43.86	14.04	44.00	14.08	44.14	14.11
65	43.40	13.95	43.54	13.99	43.68	14.02	43.82	14.05	43.95	14.09
66	43.21	13.93	43.35	13.97	43.49	14.00	43.63	14.03	43.77	14.06
67	43.03	13.91	43.17	13.94	43.30	13.98	43.44	14.01	43.58	14.04
68	42.84	13.89	42.98	13.92	43.12	13.95	43.25	13.99	43.39	14.02
69	42.66	13.86	42.79	13.90	42.93	13.93	43.06	13.96	43.20	13.99
70	42.47	13.84	42.61	13.87	42.74	13.91	42.88	13.94	43.01	13.97
71	42.29	13.82	42.42	13.85	42.55	13.88	42.69	13.91	42.82	13.95
72	42.10	13.79	42.24	13.83	42.37	13.86	42.50	13.89	42.63	13.92
73	41.92	13.77	42.05	13.80	42.18	13.83	42.31	13.87	42.44	13.90
74	41.73	13.75	41.86	13.78	41.99	13.81	42.12	13.84	42.25	13.88
75	41.55	13.72	41.68	13.76	41.81	13.79	41.94	13.82	42.07	13.85
76	41.36	13.70	41.49	13.73	41.62	13.76	41.75	13.80	41.88	13.83
77	41.18	13.68	41.30	13.71	41.43	13.74	41.56	13.77	41.69	13.80
78	40.99	13.65	41.12	13.69	41.25	13.72	41.37	13.75	41.50	13.78
79	40.81	13.63	40.93	13.66	41.06	13.69	41.18	13.73	41.31	13.76
80	40.62	13.61	40.75	13.64	40.87	13.67	41.00	13.70	41.12	13.73
81	40.44	13.58	40.56	13.61	40.68	13.65	40.81	13.68	40.93	13.71
82	40.25	13.56	40.37	13.59	40.50	13 62	40.62	13.65	40.74	13.68
83	40 07	13.53	40.19	13.57	40.31	13.60	40.43	13.63	40.55	13.66
84	39.88	13.51	40.00	13.54	40.12	13.57	40.24	13.60	40.37	13.64
85	39.70	13.49	39.82	13.52	39.94	13.55	40.06	13.58	40.18	13.61
86	39.51	13.46	39.63	13.49	39.75	13.52	39.87	13.55	39.99	13.59
87	39.33	13.44	39.44	13.47	39.56	13.50	39.68	13.53	39.80	13.56
88	39.14	13.41	39.26	13.44	39.38	13.47	39.49	13.51	39.61	13.54
89	38.96	13.39	39.07	13.42	39.19	13.45	39.31	13.48	39.42	13.51
90	38.77	13.36	38.89	13.39	39.00	13.42	39.12	13.46	39 23	13.49
91	38.59	13.34	38.70	13.37	38.81	13.40	38.93	13.43	39.04	13.46
92	38.40	13.31	38.51	13.34	38.63	13.37	38.74	13.41	38.85	13.44
93	38.22	13.29	38.33	13.32	38.44	13.35	38.55	13.38	38.67	13.41
94	38.03	13.26	38.14	13.29	38.25	13.32	38.37	13.35	38.48	13.38
95	37.85	13.24	37.96	13.27	38.07	13.30	38.18	13.33	38.29	13.36
96	37.66	13.21	37.77	13.24	37.88	13.27	37.99	13.30	38.10	13.33
97	37.48	13.19	37.58	13.22	37.69	13.25	37.80	13.28	37.91	13.31
98	37.29	13.16	37.40	13.19	37.51	13.22	37.61	13.25	37.72	13.28
99	37.11	13.14	37.21	13.17	37.32	13.20	37.43	13.23	37.53	13.26
100	36.92	13.11	37.03	13.14	37.13	13.17	37.24	13.20	37.34	13.23
101	36.73	13.09	36.84	13.12	36.95	13.15	37.05	13.18	37.16	13.20
102	36.55	13.06	36.65	13.09	36.76	13.12	36.86	13.15	36.97	13.18
103	36 36	13.04	36.47	13.06	36.57	13.09	36.67	13.12	36.78	13.15
104	36.18	13.01	36.28	13.04	36 38	13.07	36.49	13.10	36.59	13.13
105	35.99	12.98	36.10	13.01	36.20	13.04	36.30	13.07	36.40	13.10
106	35.81	12.96	35.91	12.99	36.01	13 02	36.11	13.04	36 21	13 07
107	35.62	12.93	35.72	12.96	35.82	12.99	35.92	13.02	36.02	13.05
108	35.44	12.90	35.54	12.93	35.64	12.96	35.73	12.99	35.83	13 02
109	35.25	12.88	35.35	12.9*	35 45	12.94	35.55	12.96	35.64	12.99
110	35.07	12 85	35.17	12.88	35 26	12.91	35.36	12.94	35.46	12.97
111	34.88	12.83	34.98	12.85	35.08	12.88	35.17	12.91	35.27	12.94
112	34.70	12.80	34.79	12.83	34.89	12.85	34.98	12.88	35.08	12.91
113	34 51	12.77	34.61	12.80	34.70	12.83	34.80	12.86	34.89	12.88
114	34.33	12.75	34.42	12.77	34.51	12.80	34.61	12.83	34.70	12.86
115	34.14	12.72	34.24	12.75	34.33	12.77	34.42	12.80	34.51	12.83
116	33.96	12.69	34.05	12.72	34.14	12 75	34.23	12.77	34 32	12 80
117	33.77	12.66	33.86	12.69	33.95	12.72	34.04	12.75	34.13	12.77
118	33.59	12.64	33.68	12.66	33.77	12.69	33.86	12.72	33.94	12.75
119	33.40	12.61	33.49	12.64	33.58	12.66	33.67	12.69	33.76	12.72

PART VI—Plasticity

The material presented on streamline flow of fluids, may be summarized by referring to Poiseuill's Law as expressed in the definition of the Poise as a fundamental unit in measurement of viscosity. Notice that in this definition, fluid flow as measured by velocity or volume, varies directly with the applied force, no matter how small this may be. This is illustrated by the straight line OA in *Figure 29*, which by the definition passes through the origin. Similar lines for different viscosities will have different slopes, such

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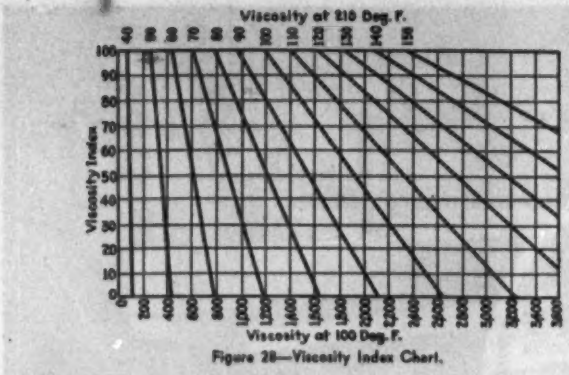

Figure 28—Viscosity Index Chart.

as OD for a lower viscosity, which of course has a greater flow when subjected to a given force. Conversely, no matter how viscous the fluid may be, application of a shear producing force will cause flow. No matter how slow this flow may be, the line representing the force-flow relations will *pass through the origin*. This is essential in the understanding of the present use of the word *fluid* (whether liquid or gas).

In Part III it was shown that as the flow rate of a fluid is steadily increased, a critical region will be reached eventually, where the streamline flow represented by a straight line such as OA or OD in *Figure 29*, will merge into a region of turbulent flow which will be represented by a curved line, such as CB which represents a much slower increase of flow rate for a given increase of the applied force.

With these characteristic features of fluid flow clearly outlined, the distinguishing differences of plastic flow may be appreciated. Plastic materials are characterized by their ability to withstand a certain limiting sheer force indefinitely without flow, but after this limit is exceeded, flow results which increases with the magnitude of the force. This is illustrated in *Figure 30*. When a force equivalent to OA is exceeded, flow will result which may follow a line such as AB or a curve such as AC, depending on the material. The

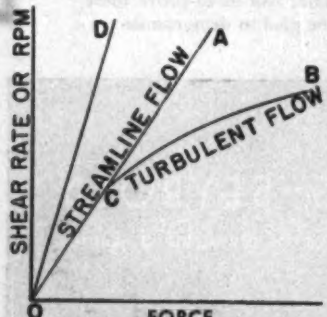

Figure 29—Viscous flow characteristics; force-shear rate lines pass through origin.

rate of flow, or the slope of the line, is controlled by a characteristic similar to fluidity in fluids (the inverse of viscosity), but is designated as Mobility. Thus the flow characteristics of a plastic material require knowledge of both the yield point, and mobility in order to be identified as definitely as a fluid is by its viscosity.

In practice, plasticity may be measured by torsion viscometers from readings made at two or more speeds. The instrument illustrated in *Figure 5* has several speeds provided for this purpose in the gear trains. Torsion instruments which use a falling weight to rotate a cup or rotor, such as shown in *Figures 2* and *3*, may reveal plastic

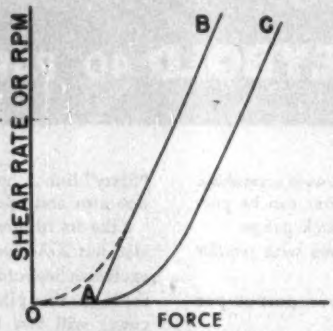

Figure 30—Plastic flow characteristics; normal flow or shear rate is not established until some critical yield point is exceeded.

data, by tests run with different weights. Efflux viscometers may be used also, if the pressure causing flow is variable, as when caused by air pressure instead of gravity.

There are many industries where the measurement and control of plasticity are required, typical among them being the manufacturers of paint. The petroleum industry's use of such measurements consists primarily in the control of the consistency of greases. To a lesser extent it is also interested in control of the consistency of "mud" used in deep oil well drilling operations.

Lack of space prevents further consideration of plasticity, but the subject has been included here to show that most solids (plastic materials) exhibit a characteristic similar to the viscosity of fluids, when subjected to shear stresses beyond their yield points. Processes in which metals are formed at any temperature below their melting points are in this category, and include forging, wire drawing, extrusion, etc.

Retrospect

It has been the intention in gathering together these notes on the broad subject of viscosity, to present material for convenient reference which has been published in *Lubrication* from time to time. Additional material has been added to give a rounded picture of the general subject. While the text has been intended for the casual reader, references and equations have been given in footnotes, so that those technically interested may refer to the original sources of information for further study.

The significance of viscosity in evaluating the performance of lubricants, the ability to sustain loads in bearings, the effect on oil consumption and wear in engines, have also been covered from time to time in past issues of *Lubrication*. Further application of the significance of viscosity at this time is outside the scope of this article.

EMPIRE'S WASTE TREATMENT

The State Sanitary Water Board of Pennsylvania has issued a permit for construction of a waste treatment system at the Empire Box Corp., Smithfield, Pa. The system will provide for chemical treatment of some 650 gallons of waste material a minute and facilities for the disposal of sludge. It will be ready for operation by March 1.

SULPHITE LIQUOR TANNING

APPLETON, Wis. — Leather is being made in American tanneries with tanning extract derived from spent sulphite liquor by Marathon Corp., Rothschild, Wis. This tanning extract replaces materials which are for the most part imported from South America.

Tanneries in the United States are now using Marathon's product, and a corresponding quantity of sulphite liquor is thus kept from going into the Wisconsin river. The company's chemical division is currently utilizing for various by-products as much spent sulphite liquor as it is able to collect from the pulping process. Plans are being made to develop and install during 1951 more advanced collection equipment so that still more of the total spent liquor can be processed and utilized.

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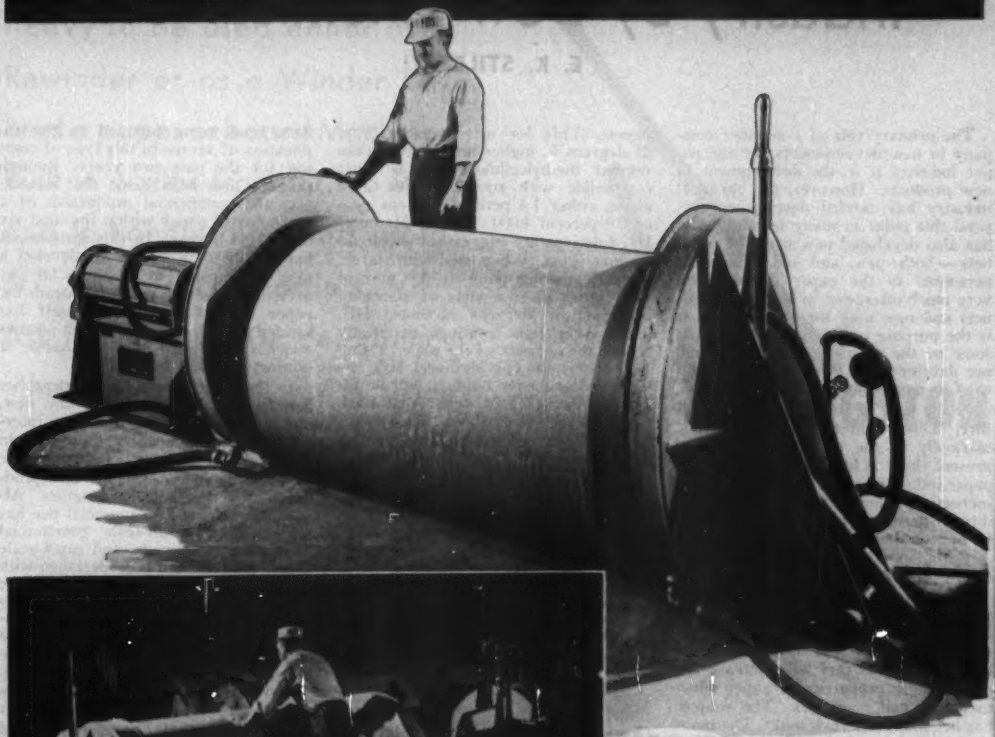

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Recent Developments for the Paper Industry By Dow Chemical Co.*

E. K. STILBERT[1]

The primary role of a supplier company in new developments for the paper industry is in the development of new products. However, the chemical industry has carried development beyond this point in many instances and has also developed new uses for products — both new and old. Technical personnel in the paper industry are very much interested in both new products and new uses for all products. It is the purpose of this paper to discuss some of the most recent material and use developments of The Dow Chemical Co.

In the field of basic paper manufacture, Dow's interest has increased markedly in the past few years. At present there is little to report, but the paper industry can expect to receive an increasing volume of assistance if conditions permit development operations to be continued as presently planned.

Beater Sizing

In the field of beater sizing, much work has been done with methylcellulose due to its high film strength and evidence that it is one of a small number of materials that will increase the dry strength properties of paper when used in small quantities. The subject has been recently reviewed.[1] The main objections to methylcellulose appear to be foaming and retention.

A new, modified methylcellulose, called Methocel CAM, has now been developed for beater sizing work. It can be added to the beater at the beginning of the beating cycle as supplied. It goes into solution during the beating cycle and can be readily precipitated on the fiber at the end of the cycle by the addition of alum. Commercial development work is very encouraging. Although the work is not advanced enough to report details, the results are similar to those that have already been reported with methylcellulose. Elimination of the retention problem and reduction in the foam problem make this grade of methylcellulose a more efficient and economical beater sizing material.

Size Press

Another modified methylcellulose, Methocel HG, is of interest in size press work on lightweight papers such as waxing, carbonizing and manifold papers. This derivative gels at 20 to 25 degrees F. higher temperature than regular methylcellulose and is more compatible with starch. When used alone, either 1.4 percent 400 cps type or 0.9 percent 4,000 cps type Methocel HG solutions are suggested for use on the size press. When used with starch, a good starting point is 3.0 percent total solids of two parts of starch to one part of 400 cps Methocel HG. These very light coatings materially reduce the porosity of the paper. Using 1.4 percent 400 cps Methocel HG, the Gurley densometer reading will be increased two to four times that of a normal starch-sized sheet. This means improved wax or ink hold-out and no strike-through of carbonizing melts with Methocel HG sized papers.

Due to the hydrophilic nature of the product, the use of Methocel HG reduces the water resistance of the paper. Therefore, when pen and ink writing qualities are required, it is necessary to use an additive to counteract the hydrophilic properties. Glyoxal, urea-formaldehyde or melamine-formaldehyde will cross link with methylcellulose and insolubilize it. A lot of work has already been done with glyoxal for this purpose. It has been found that 20-30 percent glyoxal (based on methylcellulose solids) will effectively maintain the water resistance of the sheet.[2]

Although it has been briefly reported,[3] the development of the use of Dow Latex 512-K as a size press coating adhesive is also worthy of mention. During the past few years, the interest in improved grades of offset printing paper has grown tremendously. It has been a common practice to size such grades on the size press with clear starch. More recently some mills have begun to use some clay to increase the solids pickup and improve the surface smoothness. A further increase in smoothness and printability has been obtained by using a 50-50 blend of starch and Dow Latex 512-K with a clay-to-binder ratio of two or three to one.

Converting

The field of converting is becoming very broad and now includes some very special operations. Certain operations, though specialized, may affect a large, important phase of converting. A typical example is the hot melt (or calender) coating of polyethylene on paper for the manufacture of locker papers or multiwall bags. Experiments have been going forward on the application of sarans to this type of coating for the past two years. Enough progress has been made that we expect the commercial production of a saran-coated paper within the next six months to a year. In this instance, it has not been necessary to develop a new or unusual modification of the presently available resins. Instead, the paper converting industry itself has tackled the job of using molten plastics and has not found it as impossible or impractical as it first seemed.

In the older types of converting, we believe that two products; one new, one improved, will be of intense interest to those companies interested in antimicrobial activity. Dehydroacetic acid and its sodium salt are new products not yet in large production. Although no regular commercial use has as yet begun, full-scale commercial trials have been made, and small-scale commercial use can be undertaken with the material now available from the semi-plant. These compounds are colorless, odorless and tasteless at the concentrations required for use. They are primarily mold inhibitors but have some effect on yeasts and certain bacteria. They are virtually nonvolatile and act as contact inhibitors only. Extensive feeding tests have been carried out on rats, monkeys, dogs and humans. The data have been submitted to the Food and Drug Administration. Summaries of this work are readily available from The Dow Chemical Co.

Due to the present thinking of the Food and Drug Administration, these compounds cannot be recommended for direct addition to processed food products. They are, however, of interest as formulating ingredients in food wrappers of all types. In use concentration (for example, two percent in wax for bread or cheese wrap) only very minor quantities should be extracted by the food in most cases. Quantitative determinations should be made of residual DHA in each case where the Food and Drug Administration may be concerned.

The other product is orthophenylphenol (Dowicide 1) or its sodium salt (Dowicide A). The principal objections to this product for use in food packaging as a fungicide are its odor and taste. By use of a special purification technique, it has been possible to produce an essentially odorless product. It is an effective preservative at a concentration level that presents no taste or odor problem. Extensive

---

* Presented at the Metropolitan Group of the N. Y. Section of TAPPI in New York City on September 12, 1950.

[1] Plastics Div., Coating Technical Service, The Dow Chemical Co., Midland, Mich.

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tests have shown that this product has a very low order of oral toxicity and data based on extensive feeding tests will be submitted to the Food and Drug Administration in the near future. Orthophenylphenol could be used in paper itself but due to its volatility, is more applicable for addition to compounds for treating paper since waxes and resins tend to retain it.

Tests have recently been completed on cheese wrap which show that this material is very effective for commercial use. The same precautions of use with food products apply to orthophenylphenol as apply to dehydroacetic acid. It may be helpful to point out that these materials are of the same order or even less toxic than the plasticizers that are acceptable for use in contact with foods by the Food and Drug Administration. In general they are not used in as high a concentration in the coating as plasticizers.

Latices

Due to the vital interest of the paper industry in water as a primary processing ingredient, much work is concentrated on the development of useful compounds dispersed in water. Low-cost, tough polymers that can be handled in standard paper making and paper converting equipment are very desirable and are always of interest to the paper industry.

Such materials are generally supplied in the form of emulsions or latices which may be readily used since the polymers are already dispersed in water in particles of colloidal size. Emulsions and latices differ primarily in their ease of redispersion once the particle size becomes large enough to cause the particles to agglomerate and separate from the water phase. Many emulsions can be reworked and used. Generally latices are irreversible — once separated from the water phase, the polymer material cannot be satisfactorily redispersed. Although excellent mechanical stability is very desirable for both of these systems, it is absolutely essential for the latex system.

About five years ago a vinylidene chloride-acrylonitrile copolymer latex, Saran Latex F122-A20, was introduced to the paper industry. It was of interest to the industry because it deposited a very tough, nontacky film with excellent grease and chemical resistance. Unfortunately, the latex was more difficult to manufacture than was anticipated. It was withdrawn from the market within two years after its introduction and restricted to a few development accounts because of its poor mechanical stability in the latex form. Within the past year research work has been completed on this product which has led to the manufacture of a very uniform, mechanically stable latex. This latex is again being offered for sale under the same name, Saran Latex F122-A20, with full assurance that the improved quality can be maintained. The latex is supplied at 52.5 percent solids and deposits a clear, nontacky, tough film with simple air drying. When maximum toughness is desired, elevated drying temperatures must be used. The latex is not suitable for clear or white coatings where color stability is required since the film yellows on exposure to sunlight.

An entirely new latex has recently been introduced to the trade as a sales item. It is a vinyl chloride-vinylidene chloride copolymer latex, Dow Latex 744. It is a general purpose coating material which must be modified with plasticizers in order to form a continuous film. It possesses excellent mechanical stability, is readily plasticized, and is compatible with a wide range of coating and sizing agents. Detailed information is available on the handling of this latex. It is so new that no detailed information is available on fields of use. The fact that deposited films are clear, nontacky, grease resistant, heat and light stable, color stable and flexible at low temperatures when properly plasticized indicates that it will find wide use as protective and decorative coating.

For those fields of application where the use of liquid plasticizer is objectionable, Dow Latex 744 can be modified with other latices to form clear, nontacky films. Typical latices are Rhoplex FRN, Hycar OR25, Neoprene 571 or 842A and Dow Latex 512-K. Dow Latex 744 may also be considered as a compatible hardening or toughening agent for these soft, rubbery latices in uses where their unmodified film strength is too low.

Resins

Ethylcellulose is one of Dow's oldest plastic products. It has always been used as a solution in organic solvents and has been objectionable for some applications because of this. In order to overcome this objection, attempts were made before 1940 to market a lacquer emulsion of this resin. It was not popular due to the low film solids and the presence of organic solvent in the emulsion. Within the past year a method has been found to emulsify Ethocel without using volatile solvent to first disperse it. The method requires special equipment such as a jacketed kettle and a heavy-duty, anchor-type agitator. Very stable, small particle-size emulsions of 35-40 percent solids can be readily made. Detailed information is available on request.

It appears that we are again at the start of an intensive development program throughout all industry. The new military defense program will require new products and new methods of preparation to meet new and revised specifications. Since voluntary (or legislated) priority will be given to materials for military use, it behooves everyone in industry to become acquainted with the up-to-date military requirements and to hasten development projects to insure full use of present production facilities. It has been emphasized that the new military program need not create civilian shortages. This, however, will prove to be relative. The over-all demand may be only 15-20 percent of our productive capacity, but this will undoubtedly be unbalanced. Already there are indications that the total supply of certain materials may not satisfy the military applications of these materials. In such instances, substitutes must be quickly found to insure the continuance of the civilian phase of the product's use. In view of this situation, it is more important than ever that everyone in the paper industry interested in producing finished products keep up-to-date on new basic materials and methods of adapting these to their own operations.

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[1] Jayne, J. E., Torgren, J. C., and Jackson, D. T., TAPPI, 33 No. 1: 32-35 (January, 1950).

[2] U. S. Patent 2,329,741.

[3] Stilbert, E. K., Paper Mill News, 72:79-80 (June 25, 1949), Paper Trade Journal, 128:98-99 (June 23, 1949).

BURN AMMONIUM-BASE LIQUOR

APPLETON, Wis.—Technical directors and combustion engineers from fourteen sulphite pulp mills gathered on December 22 to watch the first Wisconsin test of burning ammonium-base sulphite liquor as industrial fuel. Purpose of the test was to find more feasible methods of reducing sulphite pollution of streams. Scientists in charge of the test announced that the results were not conclusive, but valuable data were yielded for use in future experiments.

All sulphite pulp mills in Wisconsin used the calcium-base method of pulping until Wausau Paper Mills Co. at Brokaw, last month shifted over experimentally to use of the ammonium-base process to learn whether it obviates some of the major difficulties inherent in reducing pollution from calcium-base liquor. Concentrating calcium-base sulphite liquor is troublesome because the lime in the liquor forms deposits of scale on the surfaces of the evaporator equipment, interfering seriously with efficient functioning. When the concentrated calcium-base liquor is burned for fuel, the lime forms a fine fly-ash that is difficult to collect but must be collected to prevent air pollution.

The experiment was made using ammonium-base liquor from the Brokaw pulp mill. The material was concentrated in the Appleton pilot plant of the Sulphite Pulp Manufacturers' Research League, and the actual burning tests were made in a furnace at the Interlake mill of the Consolidated Water Power and Paper Co., Appleton.

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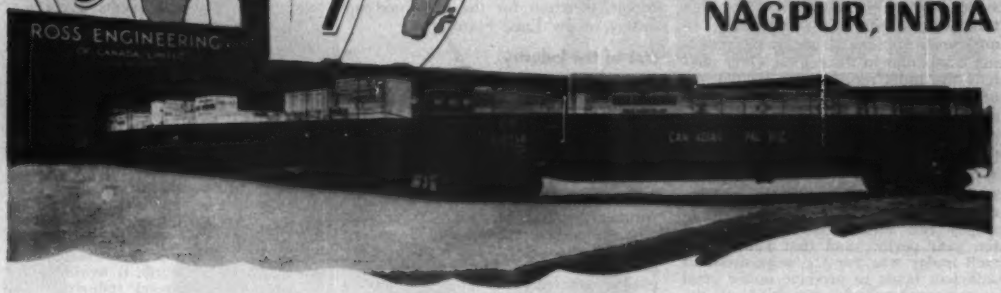

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Status of Forestry in the Pulpwood Industry in the Lake States*

G. B. AMIDON
Minnesota & Ontario Paper Co.

At the American Pulpwood Association meeting in New York in 1948 I talked on the progress of forestry in the Lake States pulpwood industry since 1937. The information for this talk was based on the returns of a questionnaire sent to all pulp producing companies in the region. Over one-half the mills representing 62 percent of the region's pulpwood capacity answered the questionnaire. The major conclusions based on this survey were that the industry employed five times as many foresters in 1947 as compared to 1937, that land ownership had increased from one million acres to nearly two million acres during the ten year period, and that plans were well under way for the acquisition of sufficient lands to produce under good management nearly one-third of the industry's annual requirements.

When Mr. Brinckerhoff asked if I would discuss this subject again this year I felt that in view of pending legislation it was important to obtain as current and complete information as possible. Because of the fine cooperation received on the survey made in 1947 it was felt that another questionnaire was the best way to obtain the information desired. It also provided an opportunity to check the results of the earlier survey. Therefore, about a month ago a questionnaire similar to the one sent out in 1947 was sent to the same pulp producing companies. This time, returns were received from over two-thirds of the mills representing 60 percent of the 1949 consumption for the region. In view of the normal distaste for questionnaires, this high return seems to indicate the extreme interest in the topic chosen for this meeting and also a recognition of the importance of the need to expose the facts of what the industry is doing in forestry in order to effectively present industry's side of the controversial conservation picture.

The results of this survey support the information obtained in 1947. Comparing the major items it is found that in 1950 nearly 5½ times as many foresters were employed as in 1937, that land ownership had increased from 1 million acres in 1937 to 2,700,000 acres in 1950, and that future acquisition plans now call for sufficient lands to produce over one-third of industry's annual needs. Before discussing the returns of this survey, it will probably be helpful to an understanding of the significance of the survey results if we briefly review the requirements and supply situation for the pulpwood industry in the Lake States.

* Presented before the 1950 Annual Meeting of the American Pulpwood Assn.

Size of the Industry

There are 112 pulp, paper, and paper board mills in the region. About 47 percent of these are in Wisconsin, 43 percent in Michigan, and 10 percent in Minnesota. Consumption in 1949 was 2,423,000 cords or 12 percent of the national total (61 percent of this was spruce, fir, and hemlock, 20 percent pine, 17 percent poplar, and 2 percent mixed hardwoods). This is about 600,000 cords higher than in 1937. The greatest increase for any one species has been in poplar which was 111,000 cords or 6 percent of the total in 1937 compared to 412,000 cords or 17 percent of the total in 1949.

Forest Area and Ownership

Over 50 million acres or about 40 percent of the gross area in the region is classified as commercial forest land. Nearly 30 million acres is in pulpwood species.

Ownership of the commercial forest land has changed greatly during the past 20 years due principally to high tax rates, delinquency and tax forfeiture. About 13 million acres have reverted to the States and counties through tax default, and in 1945 over 21 million acres or 42 percent was in public ownership. More forfeiture has taken place since then so the percentage in public ownership is even greater at the present time. The area by ownership in 1945 was as follows:

Owner	Thousand Acres	Per Cent
Federal	6,495	13
State	7,810	15
County & Municipal	6,995	14
Total Public	21,300	42
Private	29,045	58
Total	50,345	100

The land in public ownership varies considerably for the different states. The proportion is highest in Minnesota with 59 percent under Federal, State, and County control, and lowest in Wisconsin where the public controls 32 percent of the forest land. Of the 29 million acres in private ownership about 14 million acres is in farm woods and as previously noted, nearly 3 million acres is owned by the pulpwood industry. (Ownership of the remaining 12 million acres is not definitely known, but it seems likely that a large percentage of it is tax delinquent and held by absentee owners.)

Pulpwood Volume, Drain and Allowable Cut

The present volume of pulpwood species of both sawlog and pole size is over 80 million cords. However, there is considerable demand for hemlock, jack pine, and aspen as lumber so the entire 80 million cords will not be available for pulpwood. On the basis of past use it is estimated that about 60 million cords is available for use by the pulpwood industry. The total volume by species is as follows:

Species	Million Cords [1]	Per Cent
Spruce	13.2	16
Balsam	11.6	14
Hemlock	15.6	19
Jack Pine	10.4	12
Aspen	32.6	39
Total	83.4	100

[1] Source: Lake States Forests and the Pulp and Paper Industry by E. L. Demmon, Dec., 1946.

(The forest survey figures prepared by the Lake States Forest Experiment Station show that all pulpwood species except aspen and balsam have been seriously overcut since 1935. According to this source, hemlock of sawlog and pole size is being depleted nearly three times as fast as it should be, spruce about twice as fast and jack pine about 30 percent over the allowable drain. At the other extreme about 2½ times as much aspen could be used.)

On the basis of past use the estimated proportion of the annual allowable drain available to the pulpwood industry is about as follows:

Species	Allowable Drain (thousand cords)	1948 Production [1]	Difference
Spruce	210	437	+ 227
Balsam	290	401	+ 111
Hemlock	240	182	— 58
Jack Pine	310	493	+ 183
Aspen	2040	624	—1416
Total	3090	2147	— 943

[1] Source: Lake States Forest Experiment Station Technical Note No. 320. Regional production of pulpwood.

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It will be noted that in 1948 all species except aspen and hemlock were overcut. The use of balsam has increased considerably in recent years and the 1948 cut was 143,000 cords greater than the cut in 1946. The Lake States' mills supplemented the regional supply with imports from Canada and within recent years, from some of the western states. In 1948, 760,000 cords, mostly spruce and pine, were imported from Canada and 35,000 cords from the west.

So far in this discussion we have noted the major requirements and supply facts for the industry. In summary these are (1) consumption in 1949 was 2,423,000 cords, (2) there are 50,345,000 acres of commercial forest land in the region and about 30 million acres of this is growing pulpwood, (3) about 29 million acres is in private ownership and nearly one-half of this is in farm woods, (4) the present merchantable volume of spruce and balsam will last about 30 years and jack pine about 20 years at the present rate of cutting, and (5) according to the allowable cut figures, spruce in 1948 was overcut by 227,000 cords, balsam by 111,000 cords, and jack pine by 183,000 cords, and poplar was undercut by over 1 million cords.

We may disagree with these allowable cut figures but whether we do or not it is evident that the supply of spruce in the Lake States is seriously short and that the present merchantable stands of jack pine may run out before the younger stands become merchantable. In 1948 even balsam was overcut but this is the first year that cut exceeded growth for this species and it is believed that this will balance out if the cut is not increased in the future. It is also evident that there is a considerable surplus of aspen.

The major problems which these facts present is that substitutes must be found for spruce and we must grow more wood on our forest lands in the future than we have in the past. A great deal of progress has been made in using more of those species in surplus supply as evidenced by the increased use of balsam since 1946 and poplar since 1937. As previously noted poplar in 1949 made up 17 percent of the total consumption compared to 6 percent in 1937. This trend will undoubtedly continue in the future.

A great deal of progress has also been made in the job of growing more trees but the opportunities for increasing the present growth rate have only recently been fully appreciated. For example the 30 million acres of pulpwood growing lands presently permit an allowable cut of roughly 3 million cords which is the equivalent of 1/10 of a cord per acre annually. This is extremely low and even for large areas of Lake States timber lands it is believed possible to grow annually 1/5 of a cord per acre or 10 cords in 50 years with good management. At this rate the allowable cut could be increased to 6,000,000 cords. This brings us to the results of the survey on the Status of Forestry in the pulpwood industry. What is being done to grow more trees?

Number of Foresters Employed

Foresters think foresters are needed to grow trees. This, of course, is not necessarily so, but the number of trained foresters employed does, nevertheless, indicate the type and amount of forestry work being done. There are 34 pulp producing companies in the region and 23 of the companies returned the questionnaire. Of these 23 companies, 17 employed foresters and this is 75 percent of all mills compared to 35 percent in 1937. These 17 companies employed 86 trained foresters and 25 practical foresters and 58 spent all or part of their time on forest management work. (The others were employed in timber buying, logging, and executive positions.) The number of trained foresters employed for the different years is as follows:

	Reporting Mills	Est. for All Mills
1937	17	27
1947	81	130
1950	86	145

The estimate for all mills assumes that the returns were from a representative sample. It is further estimated that the annual expenditures for forest management work for all mills is presently about $600,000, or roughly about 30 cents per cord consumed in 1950 by those mills employing foresters.

Land Ownership

Thirteen of the 23 companies reporting or nearly 60 percent owned some forest land in 1950. The acreage varied from 4,000 acres to about one-half million acres and totaled nearly 1,600,000 acres. The acreage owned for the mills reporting and an estimate for all mills for the different years is as follows:

	Reporting Mills (acres)	Est. for All Mills (acres)
1937	662,000	1,000,000
1947	1,185,000	1,900,000
1950	1,591,000	2,700,000
Future Plans	2,334,000	4,000,000

About 55 percent of the present ownership is in merchantable types and the balance in young growth or nonproductive. On the basis of the number of foresters employed in forest management activities the average area per forester is about 27,000 acres. This is an interesting figure for comparison with what other agencies are doing. For example, the counties in Minnesota are attempting management with one forester per about 100,000 acres.

As noted above, the mills hope to acquire an additional 1,300,000 acres of land in the future. However, in some areas there is a limited amount of private land available for purchase and most of the public land cannot be purchased. In Minnesota county lands are available but the mills here have had considerable difficulty buying these lands due to the attitude of some of the counties and some State personnel.

Planting Program

Eight of the 23 mills reporting or about 33 percent are carrying on a planting program on their own lands. The first planting by industry was in 1926 and since then about 60,000 acres have been planted. Future plans for all mills call for the planting of about 10,000 acres annually for the next 10 years. At 1,000 trees per acre this will require a program of 10 million trees per year. A number of mills have their own tree nurseries and these future plans represent a greatly expanded program.

Management Practices

Nearly one-half of the lands owned by the pulp mills are cutover lands and, therefore, support only seedling and sapling stands. Consequently, at the present time these lands do not contribute appreciably in satisfying mill needs. The present cut from 1,591,000 acres owned by mills reporting is only about 70,000 cords per year or the equivalent of less than one-twentieth of a cord per acre for the total area.

All of the mills owning land stated that their lands are or soon will be managed for sustained yield. This is supported by the present cut which is obviously very conservative and should result in building up the growing stock. Eventually, the cut on the 2,700,000 acres presently owned by the mills should grow one-fifth of a cord per acre or 540,000 cords annually. This is over 20 percent of the present mill needs. With a future ownership of 4 million acres, the mills should grow about 800,000 cords per year or one-third of the present requirements.

At the present time the mills obtain about 5 percent of their needs from their own lands, 40 percent from other private lands, 25 percent from public lands, and 30 percent from imports outside the region. Plans for the future indicate that wood from imports and other private lands will be sharply reduced and the distribution will probably be 30 percent from company lands, 25 percent from other private lands, 25 percent from public lands, and 20 percent from imports.

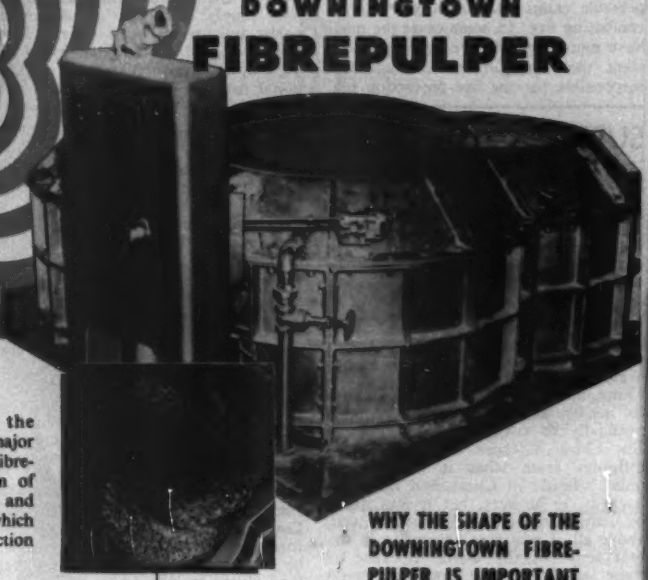
Other Activities

As noted above the small woodlot owner is very important as a supplier of pulpwood to the Lake States mills. Most of the wood from other private lands comes from this source and this probably amounts to about 600,000 cords a year. For this reason about one-half the mills in the region provide assistance in one form or another to these small owners. This assistance consists of supplying planting stock and planting machines free of charge, preparation of management plans, and marking timber. Many of the mills

WHAT SHAPE CAN DO

produces MORE with LESS power

DOWNINGTOWN FIBREPULPER



Because of its unique design, the Downingtown Fibrepulper marks a major advance in stock preparation. The Fibrepulper requires less power per ton of product than any similar machine and provides these additional features which bring substantial savings in production costs:

1. Shorter pulping period with less hydration and higher freeness.
2. Faster time cycle, providing greater pulping capacity per machine.
3. Compact design takes less floor space.
4. Custom designed and built to meet your particular operating conditions and production requirements.
5. Smaller capital outlay with lower charges to overhead.

Write NOW for complete specifications and description of the Downingtown Fibrepulper giving tons-per-hour capacity needed.

WHY THE SHAPE OF THE DOWNINGTOWN FIBREPULPER IS IMPORTANT

The Fibrepulper is designed with four lobes, each of which develops its own stream of stock feeding the pulp back to the impeller in an interweaving, overlapping pattern. Stock circulating around the periphery is forced back to the impeller and is mixed uniformly with stock from other parts of the Fibrepulper (see illustration). The large impeller increases pulping rate *without* a proportional increase in power.

MORE EFFICIENT USE OF POWER — Much of the power, used only for circulating in a round tub, is utilized for pulping in the four lobe Downingtown design. Patents applied for.

DOWNINGTOWN MANUFACTURING CO., DOWNINGTOWN, PA.

Pacific Coast Representative: John V. Roslund, Pacific Bldg., Portland 4, Oregon.

DOWNINGTOWN FIBREPULPER

It's the Shape that makes the difference

DESIGNERS AND BUILDERS OF PAPER MAKING MACHINERY SINCE 1880

also support educational programs with the schools, 4-H groups, Boy Scouts, and other organizations. Most of the mills are active in the Keep Green and Grow More Trees programs.

About 50 percent of the mills have substantial quantities of fire fighting equipment and cooperate closely with the State and Federal Governments in fire protection work. Some mills have short-wave radio networks including mobile truck units, handy-talkies and portable camp sets which are used in combating fire. In some cases the mills have more complete fire fighting equipment than the Government agencies responsible for the fire protection job.

Conclusions

In spite of the fact that many of the supply problems facing the pulpwood industry in the Lake States are extremely serious, it is believed that these problems will be solved by a continuation of the progress which has been made within the last few years.

There are three major problems to solve: (1) a much further reduction in the use of spruce and the substitution of other species which are in surplus supply; (2) the acquisition of public and private lands which can be purchased and are suitable for growing pulpwood to the extent of an additional one million acres; and (3) growing more trees on the 14 million acres in farm woods.

During the last ten years, significant progress has been made in working toward a solution of these three major problems. Balsam and poplar have been substituted for spruce to a considerable extent. The mills have acquired about 1,000,000 acres of land and about one-half of all the mills now provide assistance of various kinds to the small woodlot owner. The pulpwood industry in the Lake States is now definitely in the business of growing more trees and the status of forestry in this region is considered very good.

SUPPLIERS

CHINA-AMERICAN PAPER & PULP CO., INC., has decided to eliminate the word "China" from its name as of January 1. This step was taken with reluctance because of the company's historical and sentimental ties with a country which was not only the scene of its first enterprise but also its principal market prior to World War II.

Forty-three years ago, the parent organization was founded in Shanghai, China, and it was from that point that its paper and pulp trade expanded gradually to cover the entire world. But China in those days was vastly different from what it has become today. Trade in China had its many hazards, to be sure, but it was based on mutual trust and understanding and, above all, it was free enterprise in the best sense of the word. Because of these conditions the company could plant its roots in China, finance Chinese industry and keep considerable stocks of paper in that area.

When Communism engulfed the mainland of China they found themselves cut off from that important area. Free enterprise, the keystone of China trade, finally ceased to exist there. The only connection left with China was the name. The latest developments, however, have made it plain that "China trade" in the old sense of the word will not return for the time being, so they have eliminated the word "China" from their name. There has been absolutely no change in either the management or the organization or the method of operation of the company which will now be known as American Paper & Pulp Co., Inc.

B. F. GOODRICH CO. will build a $2,500,000 plant for the manufacture of industrial rubber products on a 120 acre tract near Marion, Ohio.

The new plant, which will have more than 125,000 square fee of floor space, will employ about 300 with a yearly payroll in excess of $1 million when in full operation, according to T. G. Graham, B. F. Goodrich vice-president. Work on the buildings will start immediately.

IPI operations in California have been conducted by a subsidiary of Interchemical Corp. called The International Printing Ink Corp., Ltd. As of December 18 the subsidiary transferred its business and assets to Interchemical Corp. and will become a part of the IPI Division. Interchemical will continue the business as the Pacific District of IPI under the name International Printing Ink Division of Interchemical Corp.

Paul N. Baxter has been appointed divisional vice-president of IPI and manager of the Pacific District. He will be located in San Francisco. Ernest A. Green is manager of the Los Angeles branch. Other Pacific branch managers remain: A. Reese, Portland; Gordon L. Smith, Seattle.

Manufacturing operations will continue as before at the Oakland and Los Angeles plants. Luke F. McGuff, formerly with the Chicago factory, will be factory manager located in the Oakland plant. R. E. Carlson continues as manager of the Los Angeles factory.

MICHIGAN ALKALI DIVISION, Wyandotte Chemicals Corp., announces that effective January 1, 1951, Paul L. Weller has been appointed district manager, Cincinnati office.

The following appointments are also effective January 1, 1951: Chas. S. Sanborn, manager, market research department; C. J. Farcasin, field supervisor, calcium chloride department, Cincinnati office; J. M. Norcott, transferred to the J. B. Ford Division, becomes manager, Pacific industrial chemicals department.

PAUL L. WELLER

FRANK E. HUTTON

BABCOCK & WILCOX CO., New York, recently appointed Frank E. Hutton to the position of executive assistant, in charge of the application and sales of heat and chemical recovery equipment, digesters, alloy castings, and other process equipment for the pulp and paper industry. In addition, Mr. Hutton will direct the sales of process equipment and alloy castings generally, and of pulverizers for cement; metallurgical and special applications.

H. K. PORTER CO., INC., Pittsburgh, Pa., following a policy of diversification of its manufacturing operations, has acquired the Delta Star Electric Co. of Chicago, Ill., manufacturers of high voltage electrical equipment.

The Delta Star Electric Co. designs and manufactures a variety of fittings, switches, insulators, conductors, supports and related equipment for the control and transmission of electricity around central power stations, substations and transformers. No change in the operations or management of Delta Star Electric Co. is contemplated.

DE VRIES TO SELL "SOLKA"

The Brown Co. announces that E. de Vries Co., division of Paper Corp. of United States, has been appointed as their sales agents for "Solka" pulps in The Netherlands.

Mr. de Vries, who is in charge of the division at the Amsterdam office, will be responsible for the sale of Brown Co. pulp.

Illustration from the Bettmann Archive

Forerunner of a Free Press

Always the printing press has been an instrument for protest against tyranny, though often it has had to operate in secret. During the French Revolution, printers set up their mobile presses in streets and alleys and turned out pamphlets until, discovered by gendarmes, they picked up their portable plants and fled to some underground refuge.

In America freedom of the press is one of our most jealously guarded possessions. Here the printing press and plentiful paper have made possible the distribution of books, magazines and newspapers to all the people at little cost. Knowledge, culture and entertainment, spread without restriction, have helped to make and keep this a nation of free people with the highest standard of living in the world. Supplying this free press with its basic product—paper—is one of the great achievements of the American pulp and paper industry.

The dramatic story of paper is told in the sound-and-color film, "Paper — Pacemaker of Progress," and in a book under the same title. Both are presented by F. C. Huyck & Sons as a tribute to the Paper Industry. The book will be sent free upon request.

F. C. HUYCK & SONS · *Kenwood Mills* · RENSSELAER, N. Y.

HUYCK *Felts*

Financial News

RAW MATERIAL SUPPLY

NEW YORK—A shortage of polyvinyl chloride resins will continue throughout next year even though vinyl resin manufacturers have produced 50 percent more in 1950 than in 1949, George A. Fowles, manager of plastic materials, B. F. Goodrich Chemical Co., stated before an "emergency session" of the plastics film, sheeting and coated fabrics conference of the Society of the Plastics Industry.

"The vinyl industry will produce and use almost 300 million pounds of resin by the end of the year, will substantially expand its facilities in 1951, and still there will be insufficient resin to meet demand because of continued shortages of basic raw materials, notably chlorine. The entire chemical industry is faced with basic shortages of this type."

At the end of 1951, vinyl resin plant capacity will be over 425 million pounds, Mr. Fowles said. However, it is extremely doubtful as to how much of the new capacity can actually be utilized unless an all-out emergency ensues with resulting allocation of basic chemicals to polyvinyl chloride manufacture, he added.

Although defense requirements for vinyl resins are taking only 10 percent of production now, the industry feels certain that this figure will increase substantially within the next six to nine months.

According to the chemical company executive, vinyl film and sheeting manufacturers are faced with two broad problems, first, to obtain a share of defense business, and second, how to operate with the limited resin available.

Mr. Fowles warned that if vinyl sheeting or film processors did not develop new and expanded uses for their products tailored to defense requirements, they could expect less and less resin in the coming year. He further stressed the importance of close cooperation between the raw material manufacturer and the processor so that a relatively smooth transition from civilian to military and essential products could be accomplished with minimum confusion.

TIN CONSERVATION NEED

WASHINGTON, D. C.—Fiber can and tube industry representatives were advised the past week of the growing stringency in supplies of tin and necessity for new conservation measures, in a series of meetings with NPA officials here.

Meetings included besides these groups, members of the tin products industry, all of whom were told that tin available for non-defense will be considerably below this year's level during 1951. Task groups from the various industries were requested to work with NPA in developing conservation measures, which will be embodied in changes in present specifications, standardization of types and sizes, and uses of substitute materials.

HARD FIBRE COMMITTEE

WASHINGTON, D. C.—Appointment of a hard fiber industry advisory committee is projected by NPA to meet the increasing problems in the manila and sisal supply-demand outlook.

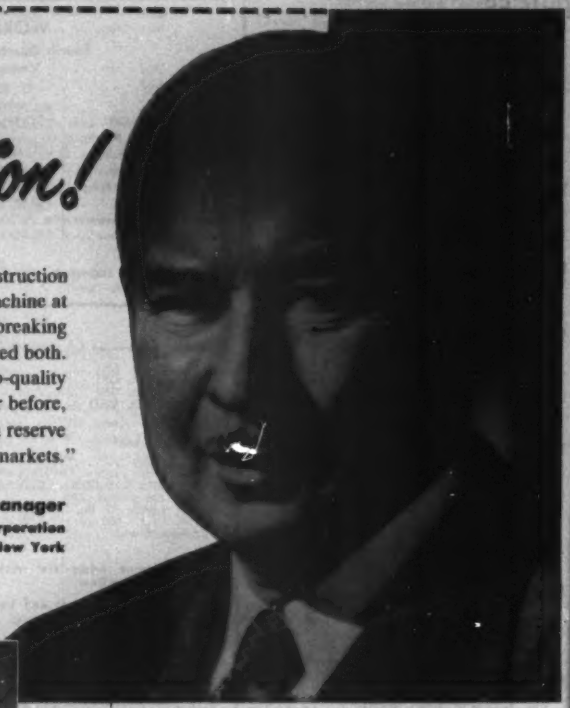
A meeting of industry representatives with NPA officials took place recently for a preliminary review of the situation, and it was agreed that further study is needed because of expected increased demand for fiber cordage products as well as for other industry uses, including some paper manufacture.

STOCK REPORT

	Per Share Earnings: Calendar Year 1949	Per Share Earnings: 12 Mo. to Approx. 9/30/50	Indic. Annual Divid. Rate	Jan. 10 Approx. Market Price
PREFERRED STOCKS				
Armstrong Cork Co. $3.75 Cum.	$40.95*	$48.14a	$3.75	$103⅜
Armstrong Cork Co. $4.00 Cum Conv.	40.95*	48.14a	4.00	114⅞
Celotex Corp. 5% Cum.	6.80c	11.70e	1.00	16⅝
Champion Paper & Fibre $4.50 Cum.	60.09f	97.99	4.50	106½
Container Corp. of Amer. 4% Cum.	89.52	122.92	4.00	105⅞
Crown Zellerbach $4.20 Cum.	54.38c	66.87	4.20	103¼
Dixie Cup Co. $2.50 Cum. Conv. Cl. A	10.93	13.70	2.50	52⅜
Flintkote Co. $4 Cum.	62.70	79.70	4.00	105¼
Robert Gair Co., Inc. 6% Cum.	13.79†	17.21†	1.20	19½
International Paper Co. $4 Cum.	224.55	323.40	4.00	108½
Kimberly Clark Corp. 4% Cum.	85.27	124.87e	4.50	106⅞
MacAndrews & Forbes 6% Cum.	61.59	63.03	6.00	140½
Mead Corp. 4¼% Cum.	51.37	88.30	4.25	93⅜
Mead Corp. 2% Cum. Conv. 2nd	21.35*	36.20*	2.00	61½
Pabco Products, Inc. 4% Cum. Conv.	56.46	124.88	4.00	99½
Rayonier Inc. $2 Cum.	9.54	17.45	2.00	36⅜
St. Regis Paper Co. 4.40% 1st A	30.74	52.38	4.40	95¾
Scott Paper Co. $3.40 Cum.	51.15*	62.16*	3.40	101¼
Scott Paper Co. $4.00 Cum.	51.15*	62.16*	4.00	106½
Sutherland Paper 4½% Conv.	46.92	68.59	4.25	116¼
U. S. Gypsum Co. 7% Cum.	283.37	429.37	7.00	183
United Wallpaper Inc. 4% Cum. Conv.	2.14	(d)17.15	2.00	24¼
West Virginia Pulp & Paper 4½% Cum.	61.24c	61.06i	4.50	111
COMMON STOCKS				
APW Products Co.	(d)0.81	0.45	—	7¾
American Writing Paper Corp.	.04	0.86	0.50	8¾
Armstrong Cork Co.	6.57	7.84a	3.75	48¾
Celotex Corp.	1.65c	3.03e	1.00	16¾
Certain-Teed Prods. Corp.	2.84	3.43	1.30	15¼
Champion Paper & Fibre	5.15f	8.93	2.45	46½
Congoleum Nairn Co.	3.04	2.70a	2.00	24¼
Container Corp. of America	4.23	5.14	2.50	33½
Crown-Zellerbach	6.02c	7.36	2.20	48¾
Dixie Cup Co.	7.44	9.87	1.50	45¼
Eastern Corp.	0.04	1.04	1.00	19¼
Flintkote Co.	4.33	5.48	3.00	26⅜
Robert Gair Co., Inc.	2.11†	2.69†	0.70	12¾
Great Northern Paper Co.	4.87	3.73	3.00	47¼
International Paper Co.	7.12	8.65	2.50	52⅜
Johns-Manville Corp.	4.83	6.38	3.50	48¼
Kimberly Clark Corp.	5.29	6.81a	1.80	44¾
MacAndrews & Forbes Co.	3.64	3.74	3.00	39¾
Marathon Corp.	3.29c	4.84e	1.40	38⅜
Mead Corp.	4.10	7.32	2.20	24¾
National Container Corp.	0.95	2.00	0.75	11½
Pabco Products, Inc.	0.85	1.95	0.60	17⅜
Rayonier, Inc.	4.75	9.73	2.50	49¼
Ruberoid Co.	7.93	8.65	3.18	49¼
St. Regis Paper Co.	0.91	1.63	0.60	12⅛
Scott Paper Co.	6.07	7.12	3.60	43⅜
Sutherland Paper Co.	4.62	6.47	2.75	44⅜
Union Bag & Paper Corp.	5.01	6.68	3.00	38⅜
United Board & Carton	(d)1.61b	1.56j	0.50	19⅜
U. S. Gypsum Co.	13.51	17.87	10.00	107½
United Wallpaper	(d)0.01	(d)0.57	—	3⅜
West Virginia Pulp & Paper	8.58c	8.36i	5.00	83

(a) 12 months to approximately 6/30/50
(b) Year ended 11/13/49
(c) Year ended 1/31/50
(d) Deficit
(f) 9 months to 12/31/49
(h) Declared 25c payable Sept. 1, 1950
(i) 12 months to 7/31/50
(j) 12 months to 11/11/50
(*) Earnings per combined preferred shares
(†) Includes domestic and Canadian subsidiaries and 60% equity in Southern Paperboard Corp.

They emphasize *production!*



"WHEN WE WERE PLANNING construction of our revolutionary new coating machine at Johnson City, N. Y., we asked for record-breaking capacity, and *reserve capacity*. We achieved both. We're producing and converting top-quality sensitized papers faster than ever before, and we still have plenty of capacity in reserve to meet new demands in expanding markets."

JAMES FORRESTAL, General Manager
OZALID, Division of GAF Corporation
Johnson City, New York

The Camachine 14 at Ozalid is equipped with pneumatic constant web tension unwind, electronic side register control and pneumatic slitter units. Speed rated at 1800 f. p. m. Maximum rewound roll diameter is 38".

OZALID's giant paper sensitizing machine, largest and fastest in the world, is capable of coating and drying 249,000 feet of 79" web per eight-hour day. The 79" web is converted to standard width rolls on a Camachine Type 14 Slitter-Rewinder. Single shift operation of the Camachine handles the complete output of the coating machine, despite overtime scheduling of the coating operation. Camachine has substantially increased the Ozalid production potential over roll converting equipment formerly used.

Its reputation for dependable, trouble-free performance at record-breaking speeds has made Camachine the *one* outstanding name in roll production equipment. No matter what material you produce or convert in roll form, Camachine engineers will be pleased to consult with you regarding faster production and improved roll quality.

Cameron Machine Company • 61 Poplar St. • Brooklyn 2, N.Y.

They can depend on Camachine

AA-521

PRICES

The prices below reflect market quotations in New York at the mill level on standard grades. Most orders accepted, however, at price prevailing on date of shipment. Does not include spot offerings.

PAPER AND BOARD

Standard News, Delivered Ports

Rolls, contract, per ton $105.00/110.00
Sheets .....

F.o.b. Mills. C.l. Frt. allowed, dock, N. Y.

Kraft— per cwt., 40# base wgt.

Standard Wrapping Rolls ..... $7.75/ —
No. 1 Wrapping Rolls 8.25/ 8.50
Standard Bag ..... 7.50/ —

Tissues— per ream 24x36 (480) 10 lbs. 2500 lbs or more

Wh. No. 1 Frd. ..... $1.85 /$2.50
Wh. No. 1 MG ..... 1.85 / —
Wh. No. 1½ ..... 1.75 / —
Wh. No. 2 ..... 1.65 / —
Kraft Non-Tar ..... 1.70 / —
White Non-Tar .....

Toilet—per case of 100 rolls—1 M sheets

Unbleached 4½x4½ ..... $8.00/$8.25
Unbleached 4½x5 ..... 6.05/ —
Bleached 4½x4½ 7.10/ 8.80
Bleached 4½x5 ..... 9.10/ —

Per Case of 50 rolls—2000 sheets

Unbleached 4½x4½ ..... $8.00/$8.25
Bleached 4½x4½ ..... 6.95/ —

Per Case of 100 rolls—1000 sheets

Facial, 4½x5, 2 ply ..... $8.95/$9.85

Paper Towels—per case of 3750

Wh. Jr. M'tif'd 9½x9½ $5.65
Br. Sr. M'tif'd 10x12 ..... 4.00
Br. Jr. M'tif'd 9½x9½ 3.50
Br. Jr. Sgl. fold 10x10½ 3.35
Blchd. 7½x11, 24/25 rolls $6.00/7.00

Manila, per cwt.

No. 1 Jute Tag sheets* $16.55/18.55
Reg. Jute M.F. 40-lb., sheets* 15.00/17.00
Wrapping Manila 8.75/ 10.50
Printing Manila 10.50/12.00
* Less usual allowance for rolls.

Gummed Tape—per bll., 500 bills. or more

90-lb. 375 ft. GSI ..... $6.90 / —
60-lb. 600 ft. GSI ..... 6.90 / —
35-lb. 800 ft. GSI ..... 7.93½/ —
35-lb. 500 ft. GSO ..... 5.98 / —

Boards, per ton—

Filled News $102.50/107.50
Plain Chip 105.00/107.50
Blchd. Mla. L.d. Chip 132.50/147.50
White Pat. coated .020 ..... 155.00/170.00
Kraft Linera 42 lb. 115.00/117.50
Kraft Carr. .009 ..... 122.50/126.00
Binders Boards 137.50/140.00

The following prices are representative distributors' resale prices:

Rag Content Bonds and Ledgers— White, 20 lb.

Bonds	4 Ctns.
	per cwt.
100% Rag Ex. No. 1	$70.45/ —
100% Rag	62.45/ —
75% Rag	48.15/ —
50% Rag	38.90/ —
25% Rag	31.65/ —
25% Rag	29.75/ 30.00

Ledgers	4 Ctns.
	per cwt.
100% Rag Ex. No. 1	$72.65/ —
100% Rag	63.90/ —
75% Rag	49.40/ —
50% Rag	40.20/ —
25% Rag	33.00/ —

Sulphite Bonds and Ledgers White, 20 lb.

Bonds	4 Ctns.
	per cwt.
Watermarked	$19.05/$19.85
Plain	18.05/ —

Ledgers	4 Ctns.
	per cwt.
Watermarked	$21.15/ —
Plain	19.35/ —

White Book

Conversion Coated	Case
	per cwt.
No. 1	$23.40/$24.65
No. 2	21.90/ 23.40
No. 3	21.15/ 22.40
Machine Coated	
No. 1	$18.15/ —
No. 2	16.15/ —
Uncoated	
No. 1 Antique (Watermarked)	$19.15/ —
Offset	17.90/ —
A Grade E. F.	17.40/ 18.15
A Grade S. C.	18.15/ 18.65
B Grade E. F.	17.65/ —
B Grade S. C.	18.40/ —

‡ Indicates a price change.

WORLD WOOD PULP MARKETS

Fourth Quarter Contract Prices, Per Short Air-Dry Ton

Varying freight allowances — Atlantic Ports

	U. S.	Canadian	Swedish	Finnish	Norwegian
Groundwood	$85.00/100.00	$85.00/100.00			
Sulphate, Bleached	135.00/200.00	175.00/ —	180.00/ —		Competitive
Sulphate, Unbl. Northn..		140.00/155.00	153.00/165.00		
Sulphate, Unbl. Southn...					
Sulphite, Blchd. (Sftwd.)	135.00/165.00	145.00/ —	179.00/ —	Competitive	Competitive
Sulfite, Blchd. (Hdwd.)	150.00/175.00	132.50/150.00			
Sulphite, Unblchd.	132.50/150.00		157.00/ —		
Sulphite, Unbl'd (Glassine)		140.00/142.50			
Soda, Blchd.	140.00/142.50				

* On deck. † Delivered.

WASTE PAPER MARKET

The following quotations were gathered from major dealers in each market. They are an indication of the price range in which volume tonnage was moving on the date specified. Prices to mills, per ton, f.o.b. cars shipping point (includes brokers' fee.) ALL PRICES NOMINAL. SPOT OFFERINGS OR SPECIAL PACKINGS NOT INCLUDED.

	New York Dec. 21	Philadelphia Dec. 22	Boston Jan. 6	Chicago Jan. 4
No. 1 Mixed Paper	$32.00/ 35.00	$30.00/ 33.00	$29.00/ —	$33.00/ —
Boxboard Cuts	30.00/ 33.00	23.00/ 28.00	26.00/ —	38.00/ —
Mill Wrappers	30.00/ 35.00	25.00/ 35.00	30.00/ 35.00	35.00/ —
No. 1 News	37.00/ 40.00	33.00/ 36.00	33.00/ 35.00	38.00/ —
Over-issue News	40.00/ 45.00	32.00/ 40.00	33.00/ 45.00	41.00/ —
Corrugated Containers	55.00/ 62.00	50.00/ 53.00	49.00/ 65.00	52.00/ —
New Corrugated Cuts	55.00/ 62.00	45.00/ 48.00	55.00/ 65.00	62.00/ —
Double Kraft Ld. Corr. Cuts ...	100.00/110.00	90.00/ 95.00	120.00/130.00	120.00/ —
100% Kraft Corr. Cuts.....	125.00/140.00	110.00/120.00	130.00/150.00	135.00/ —
Used Kraft Bags	85.00/ 95.00	60.00/ 70.00	85.00/ 95.00	65.00/ —
No. 1 Brown Kraft Paper	90.00/ 95.00	70.00/ 80.00	90.00/110.00	63.00/ —
Super Resorted Br. Kraft	100.00/105.00	85.00/ 95.00	100.00/125.00	90.00/ —
New Br. Kraft Env. Cuts	160.00/175.00	130.00/135.00	160.00/180.00	150.00/ —
New Br. Kraft Cuts	150.00/180.00	125.00/ —	150.00/180.00	140.00/ —
No. 1 Gdwd Shvs.	80.00/ 85.00	75.00/ 80.00	80.00/ 85.00	75.00/ —
White Newsblanks	110.00/120.00	105.00/110.00	110.00/120.00	115.00/ —
No. 1 Flyleaf Shvs.	80.00/ 85.00	90.00/ 95.00	95.00/105.00	110.00/ —
No. 1 Soft Wht. Shvs.	175.00/190.00	170.00/175.00	175.00/195.00	175.00/ —
Super Soft Wht. Shvs.	190.00/200.00	180.00/ —	190.00/200.00	185.00/ —
Hd. Wht. Shvs.	185.00/205.00	185.00/195.00	190.00/215.00	180.00/ —
Hd. Wht. Env. Cuts	200.00/235.00	195.00/210.00	200.00/235.00	190.00/ —
New Manila Env. Cuts	140.00/150.00	125.00/ —	140.00/165.00	130.00/ —
Col. Tab Cards	90.00/105.00	100.00/110.00	95.00/135.00	100.00/ —
Manila Tab Cards	150.00/170.00	160.00/170.00	160.00/200.00	165.00/ —
No. 1 Mixed Ledger	95.00/100.00	85.00/ 90.00	90.00/105.00	100.00/ —
White Ledger	125.00/135.00	110.00/115.00	125.00/140.00	125.00/ —
No. 1 Book & Mag.†	45.00/ 50.00	30.00/ 35.00	40.00/ 60.00	35.00/ —
No. 1 Rep'd. Hvy. Books‡	55.00/ 65.00	50.00/ —	60.00/ 75.00	55.00/ —

* Delivered. † Includes Time & Life; no coarse groundwood. ‡ Not to exceed 10% groundwood.

RAG MARKET

New Domestic Cotton Cuttings
(Prices to Dealers, F.o.b. Ship. Pt.)

ALL PRICES NOMINAL

No. 1 White Shirts	$19.00/$20.00
No. 1 Unblchd. Muslins	19.00/ 20.00
Blchd. Canton Flannels	16.00/ 17.50
No. 1 Lt. Silesias	12.00/ 13.00
No. 1 Lt. Prints	9.00/ 10.00
Wht. Bk. Blue Overalls (Bichains)	13.00/ 13.50
No. 1 Blue Overalls	7.00/ 9.00
Fancy Shirts	6.00/ 6.50
No. 1 Washables	5.00/ 5.50
Suntan Khaki Cuts	9.00/ —
Mixed Khaki Cuts	7.00/ 8.00
Corduroy Cuts	4.75/ 5.25
Cottonades	4.50/ 5.00
Blchd. Underwear Cuts	20.00/ 21.00
Unblchd. Underwear Cuts	19.00/ 20.00

Old Domestic Cotton Rags
(Prices to Dealers, F.o.b. Ship. Pt.)

ALL PRICES NOMINAL

	Per 100 lbs.
Mixed White	$4.50/$5.00
Cotton Pants & Overalls	3.75/ 4.25
Thirds and Blues, Repacked	3.50/ 3.75
No. 1 Roofing Rags	2.40/ 2.50
No. 2 Roofing Rags	2.30/ 2.40
No. 3 & 4 Roofing Rags	2.20/ 2.30
Roofing Bagging	2.20/ 2.30

New Foreign Cotton Cuttings
(Prices to Mills, F.o.b. Dock, N.Y.)

	Per 100 lbs.
New Dark Cuttings	$4.25/$4.75
New Mixed Cuttings	4.50/ 5.00
Light Silesias	7.50/ 8.00
Light Flannelettes	7.50/ 8.00
New White Cuttings	nominal
New Unbleached Cuttings	nominal
Fancy Shirt Cuttings	6.00/ 7.00

Light Prints	6.00/ 7.00
Bleachable Khaki, No. 1	4.50/ 4.00
Unbl. Khaki, No. 1	4.50/ 5.00

Old Foreign Rags

(Prices to Mills, F.o.b. Dock, N. Y.)

	Per 100 lbs.
No. 1 White Cottons	$6.50/$7.50
No. 2 White Cottons	5.50/ 6.00
No. 3 White Cottons	4.00/ 4.50
No. 4 White Cottons	3.50/ 3.75
Extra Light Prints	4.50/ 5.00
Old Light Prints	4.00/ 4.25
Med. Light Prints	3.50/ 3.75
Dutch Blue Cottons	3.75/ 4.00
Checks and Blue	3.00/ 3.50
Linsey Garments	2.75/ 3.00
Dark Cottons, European	2.25/ 2.50
Dark Cottons, Egyptian	2.15/ 2.30
Old Shopperies	2.10/ 2.25
New Shopperies	2.35/ 2.50

Bagging

(Prices to Dealers, f.o.b. N. Y.)

	Per 100 lbs.
Foreign Gunny	$7.00/$8.00
Domestic Gunny, No. 1	6.75/ 7.25
Heavy Wool Tares	6.75/ 7.50
Foreign Manila Rope	4.25/ 4.50
Domestic Manila Rope	5.75/ 6.50
Jute Strings	6.25/ 6.50
No. 1 Sisal Strings	4.50/ 5.50
Mixed Strings	nominal
Paper Mill Tares	5.25/ 5.75
No. 1 Scrap Burlap	
Foreign	5.00/ 6.50
Domestic	6.00/ 8.00
Austr. Wool Pouches	7.50/ 8.00
New Burlap Cuttings	7.00/ 7.50

MATERIALS

Aluminum, sulfate:
comi. bags, wks. ..... cwt. 1.65
iron-free c.l. 3.25

Alcohol, ethyl:
tax free, dms. c.l. ..... gal. .77 / 1.02
deld. East Miss.

Alcohol, methyl:
Synthetic, Zone 1, dms.
c.l. fit. alld. ..... gal. .44

Casein, acid-prec.:
dom. sh. pt. c.l. ..... lb. .39 / .43½
imp. ex dock ..... lb. .39½/ .40¼

Caustic soda:
c.l. wks. solid, 76%, cwt. 3.35
flak. & grd. 100-lb. drums 3.75
liquid 50% tanks 2.55
liquid 70% tanks 2.65

China clay:
dom. air-float. filler, c.l. wks.
ton 10.00
water-washed, lump, filler 11.00
coating ..... 17.60 /30.50
imported, ex whse. ... short ton 15.20 /28.35

Chlorine:
single-unit tanks, works .. cwt. 2.70
multi-unit ..... cwt. 3.20 / 4.40

Formaldehyde:
USP, ink. dms, c.l. wks. .... lb. .0600/ .0625
l.c.l. E. wks. ..... .0650/ .0675

Fuel oil:
Bunker C, No. 6 Cal. hvy
tanks, refinery ..... bbl. 1.95 / 2.15
light ..... bbl. 2.05 / 2.10

Hydrogen peroxide:
USP, 35% chys. E. of Miss.
lb. .24½/ .25½

Lime:
hydrated, bags, wks. Buffalo
ton 13.50

Rosin:
B gum, drms, c.l. Savan. .. cwt. 8.00
G, H, I ..... cwt. 8.15
K ..... cwt. 8.50
FF, wood, do. ..... cwt. 7.30

Rosin size:
70%, gum & pale grds, tank
cars, south, sh. pt. .... cwt. 6.80 / 7.00

Salt cake:
dom. bulk, c.l. wks. ..... ton 17.00
wks. frt. all. ..... ton 20.00 /22.00

Soda ash:
light, 58%, bags, wks. 1.50
bulk ..... cwt. 1.20

Sodium silicate 40°:
turbid, c.l. wks. ..... cwt. 1.20
l.c.l. wks. ..... 1.55 / 1.95

Sodium peroxide:
dms. c.l. E. of Miss. ..... lb. .19
l.c.l. do. ..... lb. .19½/ .20

Soybean, protein:
chem. isol, wks. c.l. ..... lb. .34 / —
Class. and Chic.

Sulfuric acid:
60° Be. chys. cl. wks. ... cwt. 1.75 / —
l.c.l. wks. ..... cwt. 2.05 / 2.60

Sulfur:
crude, c.l. mines, contract,
long ton 21.00 /22.00
f.o.b vessels Gulf ..... 22.50 /23.50
Export, f.o.b. Gulf 25.00

Sulfur dioxide:
liquid, coml. cyl. wks. ..... lb. .09
multi-unit cars ..... lb. .0535

Starches:
pearl corn, bags, c.l. Chic. . cwt. 3.72 / —
white dextrines, c.l. Chic. . cwt. 7.09 / —
potato, Idaho, c.l. wks. ... cwt. 5.50 / —
potato, Maine, c.l. wks. ... cwt. 5.35 / —
tapioca, conv. dextrines ... cwt. 7.50 / 8.00
medium grds. Gulf and East
Coast ports ..... 6.75 / 7.50
low, Siam, on dock N. Y. ..... 5.00 / 5.50
nominal

Talc:
domestic, 50-lb. sacks, c.l.
wks. ..... ton 25.00 /30.00

Titanium dioxide:
anastase, c.l. deld., bags .... lb. .21 / .21½
l.c.l. deld. ..... lb. .22 / .22½
rutile, c.l. deld. ..... lb. .23 / .23½
l.c.l. deld. ..... lb. .24 / .24½

N.B.: For special market conditions see *Trends*.

IMPORTS

IMPORTS AT NEW YORK

Week Ending Jan. 6

Newsprint

Madden Reeve Angel & Co., Inc., Tunaholm, Kotka, 819 rolls.
Gilman Paper Co., M. Thorden, Hallstavik, 204 rolls.
Madden Reeve Angel & Co., Inc., Mormacrio, Kotka, 1067 rolls.
News Syndicate Co., Elin Hope, Baie Comeau, 7547 rolls.
Madden Reeve Angel & Co., Inc., Mormacsurf, Kotka, 919 rolls.

Serviettes

(———), Franconia, Liverpool, 11 cs. (crepe paper).

Tracing Paper

Cartier, Inc., American Shipper, Havre, 1 cs.
E. Dietzgen & Co., American Farmer, Hamburg, 18 cs.
Lep Transport, Inc., American Banker, London, 56 rolls.

Tissue Paper

Amacan Co., Mormacrio, Copenhagen, 11 cs.

Gummed Paper

A. Theimay, Mormacsurf, Copenhagen, 1 bx.

Wallpaper

Manufacturers Trust Co., Reinholt, Yokohama, 8 cs. (grasscloth).
C. A. Haynes & Co., American Banker, London, 1 cs, 89 bls.

Rice Paper

O. Kadmon, Pioneer Sea, Keelung, 10 cs.
Gillespie & Co., Pioneer Sea, Keelung, 10 cs.

Surface Coated Paper

Gevaert Co. of America, G. Maersk, Antwerp, 59 cs.

Printing Paper

Olympic Shipping Co., G. Maersk, Rouen, 22 rolls.

Parchment Paper

Judson Sheldon Corp., G. Maersk, Antwerp, 9 cs.

Wrapping Paper

Jay Madden Corp., Mormacrio, Helsingfors, 796 rolls (sulphate).

Photo Paper

Lep Transport, Inc., Queen Elizabeth, Southampton, 45 cs. (raw base).
Alco Photo Supply Corp., Queen Elizabeth, Southampton, 5 cs.

Baryta Coated Paper

D. W. Hickey, American Banker, London, 98 rolls.

Paper Napkins

Freund Mayer Co., Mormacrio, Copenhagen, 27 ctns.

Baryta Paper

F. Post & Co., American Banker, Bremen, 28 cs.

Drawing Paper

H. Reeve Angel & Co., Inc., American Banker, London, 2 cs.

Filter Paper

H. Reeve Angel & Co. Inc., American Banker, London, 23 cs.
(———), American Scout, Glasgow, 2 cs.

Paper Caps

Drueding Bros., Exchester, Genoa, 7 cs.

Miscellaneous Paper

Penson & Co., Queen Elizabeth, Southampton, 9 cs.

Rags, Baggings, etc.

Castle & Overton, Inc., Mormacsurf, Copenhagen, 143 bls. rags.
(———), Steel King, Cochin, 200 bls. old jute rags.
Chase National Bank, City of Oxford, Calcutta, 100 bls. jutewaste.
(———), American Scout, Belfast, 115 bls. Flaxwaste.
(———), American Scout, Glasgow, 61 bls. paperstock.
National City Bank, Exchester, Leghorn, 39 bls. scrap bagging.
(———), Exchester, Leghorn, 102 bls. dark cotton rags.
Loumar Textile By Products, Exchester, Genoa, 116 bls. old scrap bagging.
A. de Vries Trading Corp., Exchester, Genoa, 73 bls. scrap bagging.
(———), Exanthia, Venice, 66 bls. waste bagging, 150 bls. paperstock.
A. de Vries Trading Corp., Nyhorn, Naples, 137 bls. dark cotton rags.
A. de Vries Trading Corp., Nyhorn, Genoa, 62 bls. bagging, 127 bls. dark cotton rags.
National City Bank, Nyhorn, Alexandria, 65 bls. old cottons.
Bankers Trust Co., Mohamed Ali El Kebir, Genoa, 7 bls. scrap nylon stockings.
National City Bank, Mohamed Ali El Kebir, Alexandria, 111 bls. old bagging.
Chemical Bank Trust Co., Nyhorn, Alexandria, 77 bls. old bagging.
A. de Vries Trading Corp., Villa du Porto, Oporto, 73 bls. scrap bagging.
Midwest Waste Material Co., Havmann, Bremen, 36 bls. cotton cuttings.

Midwest Waste Materials Co., Havmann, Hamburg, 46 bls. scrap bagging.
National City Bank, Hellenic Wave, Salonica, 156 bls. rags.
J. Stein, Uruguay, Buenos Aires, 11 bls. rags.
J. Eisenberg, Mormactide, Buenos Aires, 21 bls. rags.
Consolidated Textile Co., G. Maersk, Antwerp, 25 bls. paperstock.
(———), G. Maersk, Rouen, 31 bls. rags.
Midwest Waste Materials Co., G. Maersk, Rouen, 90 bls. rags.
E. J. Lang, G. Maersk, Rouen, 221 bls. rags.
(———), Gertrude, Buenos Aires, 52 bls. rags.
Harris Goldman Co., G. Maersk, Rotterdam, 58 bls. rags, 49 bls. old rags.
J. Eisenberg, Sibboney, Havana, 9 bls. rags.
A. Siegle Corp., Franconia, Liverpool, 78 bls. jutewaste.
National City Bank, M. Thorden, Gothenburg, 58 bls. bagging.

Old Rope

National City Bank, City of Oxford, Calcutta, 248 bls. old hemp rope cuttings.
(———), American Banker, London, 74 coils old rope, 70 bls. old strings.
National City Bank, G. Maersk, Antwerp, 62 coils old rope.
(———), G. Maersk, Rotterdam, 54 coils old rope.
E. J. Keller Co. Inc., G. Maersk, Rotterdam, 70 coils old rope.

Casein

American British Chemical Supplies, Uruguay, Buenos Aires, 500 bags (lactic).
N. Y. Trust Co., Uruguay, Buenos Aires, 1000 bags (lactic).
E. Lang, Uruguay, Buenos Aires, 2000 bags (lactic).
(———), Uruguay, Buenos Aires, 1000 bags (lactic).
American Cyanamid Co., Uruguay, Buenos Aires, 1500 bags (lactic).
The Borden Co., Chemical Division, Mormactide, Buenos Aires, 300 bags (lactic).
F. H. Paul & Stein Bros., Mormactide, Buenos Aires, 100 bags (lactic).

Woodpulp Boards

Jay Madden Corp., Mormacrio, Kotka, 604 bls.
Jay Madden Corp., Mormacsurf, Kotka, 506 bls. (beer pad mats), 1 roll.

IMPORTS AT NEWARK

Week Ending Jan. 6

Pagel Horton & Co. Inc., M. Thorden, Karskar, 1524 bls. woodpulp.
Pagel Horton & Co. Inc., M. Thorden, Ornskoldsvik, 2438 bls. dry bleached sulphate pulp.

IMPORTS AT ALEXANDRIA

Week Ending Jan. 6

Madden Reeve Angel & Co. Inc., Tunaholm, Kotka, 1055 rolls newsprint.

IMPORTS AT BOSTON

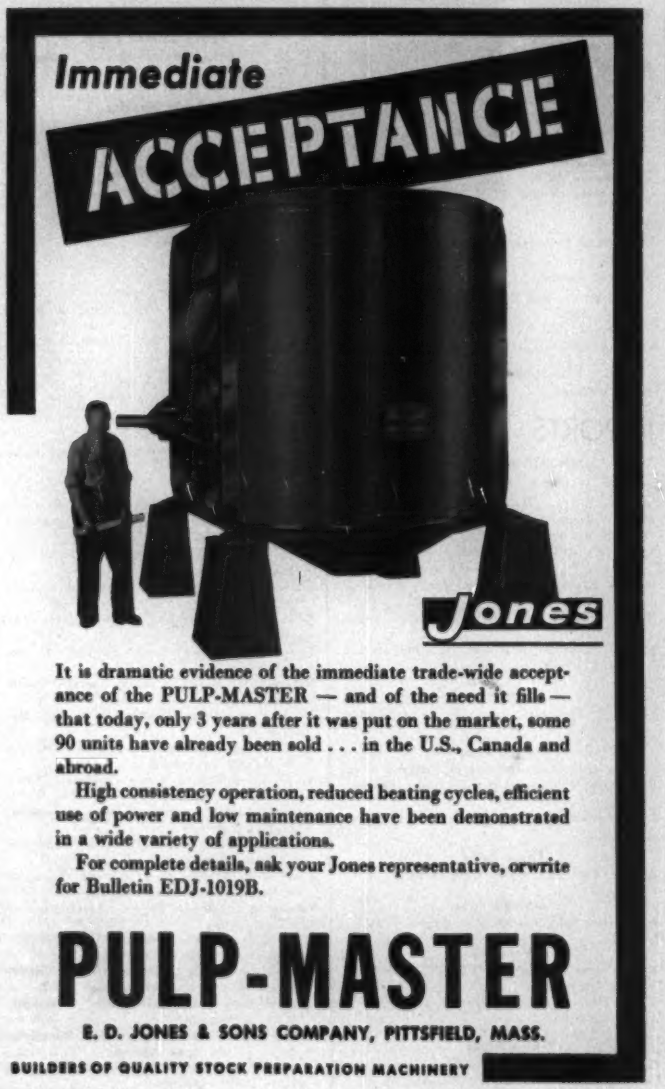
Week Ending Jan. 6

American Cyanamid Co., Gertrude, Buenos Aires, 2000 bags lactic casein.
Chemical Bank Trust Co., Nyhorn, Alexandria, 47 bls. old rags.

IMPORTS AT PHILADELPHIA

Week Ending Jan. 6

Madden Reeve Angel & Co., Inc., Tunaholm, Kotka, 1668 rolls newsprint.
Pulp Sales Corp., Tunaholm, Kotka, 779 rolls paper waste.
Pagel Horton & Co. Inc., M. Thorden, Karskar, 635 bls. woodpulp.
Pagel Horton & Co. Inc., M. Thorden, Ornskoldsvik, 1524 bls. sulphate pulp.
Pagel Horton & Co. Inc., M. Thorden, Hornefora, 4 bls. sulphate pulp.
Pulp Sales Corp., Mormacsurf, Kotka, 1056 bls. white dry mechanically ground woodpulp, 203 tons.
Madden Reeve Angel & Co. Inc., Mormacsurf, Kotka, 413 rolls newsprint.
Castle & Overton, Inc., American Scout, Glasgow, 113 bls. paperstock.
(———), American Scout, Glasgow, 65 bls. paperstock.
Public National Bank Trust Co., American Scout, Glasgow, 122 bls. paperstock.
1st National Bank of Boston, Exanthia, Venice, 43 bls. old cotton rags.
Castle & Overton, Inc., Granville, Genoa, 106 bls. old cottons.
A. L. Diament & Co., American Shipper, Havre, 34 cs. wallpaper.
Philadelphia National Bank, Nyhorn, Alexandria, 21 bls. old cloth.
Chemical Bank Trust Co., Nyhorn, Alexandria, 64 bls. rags.
J. T. Flannery, Havmann, Bremen, 56 bls. rags.
Castle & Overton, Inc., Havmann, Bremen, 34 bls. rags.
Madden Reeve Angel & Co. Inc., Mormacrio, Kotka, 874 rolls newsprint.
Jay Madden Corp., Mormacrio, Kotka, 117 rolls woodpulp boards.
Castle & Overton, Inc., Paraguay, Copenhagen, 110 bls. rags.
Philadelphia Inquirer, M. Thorden, Hallstavik, 932 rolls newsprint.
Drueding Bros., Exchester, Genoa, 8 cs. paper caps.



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PULP-MASTER

E. D. JONES & SONS COMPANY, PITTSFIELD, MASS.

BUILDERS OF QUALITY STOCK PREPARATION MACHINERY

IMPORTS AT BALTIMORE

Week Ending Jan. 6

Pulp Sales Corp., Mormacsurf, Kotka, 1116 bls. white dry mechanically ground woodpulp, 203 tons.

Jay Madden Corp., Mormacsurf, Kotka, 265 rolls solid white woodpulp boards, 44 tons.

(———), American Scout, Glasgow, 88 bls. new cuttings, 60 bls. paperstock.

F. P. Gaskell & Co., American Scout, Glasgow, 50 ea. coated paper (for cigarette tips).

E. J. Keller Co. Inc., Exchester, Genoa, 192 bls. dark cotton rags.

(———), Exanthia, Venice, 50 lbs. dark cotton rags.

S. George Co., Havmann, Rotterdam, 46 bls. old rope.

E. J. Keller Co. Inc., G. Maersk, Rouen, 74 bls. cotton rags.

Pagel Horton & Co. Inc., M. Thorden, Karakar, 508 bls. woodpulp.

Pagel Horton & Co. Inc., M. Thorden, Ornaktoldavik, 4170 bls. dry bleached sulphite pulp.

Pagel Horton & Co. Inc., M. Thorden, Hormefors, 1830 bls. dry sulphite pulp.

Jay Madden Corp., Mormacrio, Kotka, 239 rolls woodpulp boards.

Gottesman & Co., Inc., S.S. Paraguay, Iggesund, Sweden, 175 bls. bichd. sulphate; 1,700 bls. semi-bichd. sulphate.

IMPORTS AT NORFOLK

Week Ending Jan. 6

Chase National Bank, Granville, Genoa, 76 bls. waste baggings.

A. de Vries Trading Corp., Nyhorn, Genoa, 63 bls. scrap bagging.

(———), Nyhorn, Genoa, 35 bls. old bagging.

Manufacturers Trust Co., Nyhorn, Genoa, 99 bls. old bagging.

D. Benedetto, Havmann, Rotterdam, 120 bls. rags.

A. de Vries Trading Corp., Havmann, Rotterdam, 53 bls. scrap bagging.

S. Levison, G. Maersk, Rouen, 150 bls. scrap bagging.

Railway Supply & Manufacturing Co., G. Maersk, Rouen, 171 bls. jute waste bagging.

D. Benedetto, G. Maersk, Rotterdam, 77 bls. old bagging.

NEW LITERATURE

National Foremen's Institute, Inc. Manual, over 200 pp., price $7.50, "Labor Relations Work Kit". Designed to put labor relations and personnel men in touch with some successful techniques worked out by other companies who, when faced with a particular problem, came up with a workable solution.

Golden-Anderson Valve Specialty Co. Bulletin No. W-2, "Cushioned Surge Relief Valve". Features detailed sectional diagrams; tabulates parts, materials, dimensions; discusses servicing, operation.

American Leather Belting Assn. Booklet, "Uni-Pull Drive Manual". Enables reader to select, without any calculation, the proper size of flat leather belt, i.e., width, thickness and length.

Reliance Electric & Engineering Co. Booklet, "1950 Annual Report to Shareholders and Employees for the Fiscal Year Ended October 31, 1950".

Tejax Engineering Corp. Catalogue G, "Dial Indicating Handwheels". Features Valve Position Indicators and

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Name_____ Title_____

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Address_____

City_____ State_____

RECEIVING • PROCESSING • STORAGE • DISTRIBUTION

High-Lift V-Port Hand Regulating Valves.

Omega Machine Co. Bulletin 35-G5, "Midget Belt Gravimetric Feeder, Model 50-8; A Small Weighing Feeder for Dry Materials".

Fairbanks, Morse & Co. Bulletin 1215, "Totally Enclosed Non-Ventilated Motor". Announces new development in their line of type QZE.

United Laboratories, Inc. Maintenance Checking Chart, "Products and Processes for Protecting Property". Lists many common building maintenance problems and recommends a solution for each.

American Hoist & Derrick Co. Catalog No. 400-R-2, "The American Crosby Clipper". Features American's hoists, derricks, cranes and portable material elevators in actual installations.

The Bellows Co. Bulletin CL-30, "Faster, Safer, Better, Production Bellows 'Controlled-Air-Power' Devices". Tells the story of the Bellows Air Motor, the unique air cylinder, which has revolutionized the use of air power in industry.

National Research Council. Directory, 445 pp., price $5.00, "Industrial Research Laboratories of the United States". Contains information on the research labs of 2,845 industrial and commercial organizations, executives, location, services offered; including government, colleges and university research services.

B. F. Goodrich Chemical Co. Booklet, "Geon Polyvinyl Materials". Guide to Geon Latics for the Packaging Field.

Gould-National Batteries, Inc. Nine new battery specification sheets covering batteries used to supply power for "walkie" trucks. Details the dimensions, capacity, etc.

Modern Industry. Book, "Cost-Cutting Idea Book for 1950—Featuring Management Checkup Charts". Devoted to spotlighting ideas, methods, techniques, and equipment that you can put to work to cut costs, increase production.

The Jeffrey Mfg. Co. Catalog No. A418. Covers line of chains and sprockets for both new and replacement service on elevating and conveying equipment, and for drives.

Gates Engineering Co. Pamphlet, "Gaco Paper Coating Vinyl Finish". Covers its uses, advantages and application.

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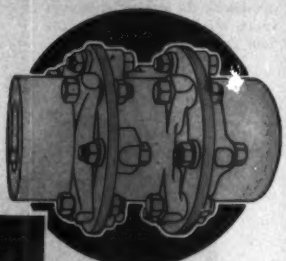

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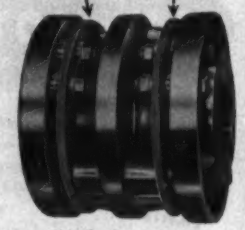

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NEW EQUIPMENT

Teleprint Weight Recorder

The new device for recording scale weights combines electronic, electrical and mechanical engineering to *read* the scale dial and convert it to weight-printings set-up on type wheels for impression on a wide variety of tickets and forms, and a single and double-roll tapes. Components are a take-off unit mounted as part of dial housing,

a servo-amplifier, and a recorder unit.

The take-off unit is an electronic follow-up system which tracks a single pointer-type electrode mounted on same shaft as dial indicator. This activates and maintains synchronism with the Recorder unit through a Servo mechanism — reproducing the dial reading exactly and setting up recorder to print weight automatically when scale comes to balance.

The Teleprint Recorder uses an ingenious and simplified cam-operated mechanism to translate dial readings into weight printings. All troublesome solenoids, electrical contacts and relays have been eliminated. One of the most important features of the Teleprint is its adaptation to automatic weighing applications. Recorder print button circuit may be extended to con-

veyor line or lever system so that the passing of boxes or loading of hoppers and tanks can register desire to print and weight will then be automatically recorded when scale comes to balance. (The Teleprint will not record with the scale in motion — during loading or filling.) On basic Teleprint and Dial combinations, printings can be made as fast as every five seconds, it is said; while on drop weight models, printings will range from one every five seconds to one every ten seconds. Of further interest is its remote feature. With the Take-off and Recorder mechanisms designed as separate units, the Teleprint Recorder may be located 500 or more feet away from the scale site with only the addition of extra cable. It is completely flexible and can be mounted to fit the user's needs.

Pulpwood Unloader

The Pulpwood Box Car Unloader was developed to eliminate hand labor in mill unloading operations. The equipment, in two operations, tilts the car and unloads the wood onto a conveyor to carry it to storage yard or to the mill. First the logs in between the two doors are pushed out by a suitable ram and platen to fall into a suitable chute for log conveyor. Then the car is pushed to the next station where unloading of car ends takes place. For this operation, the car is clamped to a track mounted on a longitudinal cradle arranged in the shape of a vertical turntable which can be tilted to a 45° angle each way. Inside the cradle, the rails supporting the car can be tilted to a transverse angle of 10°, enough to allow the logs to slide out of the car by gravity. In the center of the cradle and on the side of the car opposite the log conveyor the unloading equipment is installed to follow the two motions of the cradle, i.e., 45° each way, longitudinal tilting and 10° trans. The device is mechanical and is described as fast and foolproof.

Built-In Fire Extinguishers

Through the use of directional valves, multi-space carbon dioxide fire protection makes possible for any plant to police and protect several hazard areas on a 24-hour basis with a single source of extinguishing agent. In some plants, as many as 25 separate hazard spaces are protected with one carbon dioxide cylinder bank. Within each protected space are one or more fire detectors (of the rate-of-temperature-rise type, or electrical type) and a network of Multijet discharge nozzles. The supply source of the Multi-Space Fire Guard System comprises storage cylinders manifolded together for simultaneous discharge. The carbon dioxide discharge pipeline from the cylinder bank connects to a directional valve frame, where there is a valve for each hazard space protected. From the directional valve frame — which is prefabricated for any particular plant system — a carbon dioxide discharge line and a fire detector connecting line goes to each hazard area. When the detector picks up the first signal of fire, it actuates the directional valve controlling the group of cylinders guarding that space. A mechanical linkage, between the directional valve and the correct group of the cylinders in the supply bank, opens the release valves on the heads of these cylinders. Under its own power, the carbon dioxide rushes through the discharge piping, is directed along the path to the space in danger, and is discharged as an inert gas from the nozzles. Expanding to 450 times its stored volume the carbon dioxide completely floods the hazard space, reaches to every nook and cranny to smother fire quickly by excluding the oxygen.

To provide for utmost safety and efficiency in fire control, the system usually includes automatic controls.

Motor Starter

Protection of operating personnel as well as the connected machine is stressed in a new motor starter — the Motor Watchman. With ratings up to 600-v, 7½hp polyphase, 5 hp single phase; or 220-v, 1½ hp dc, it starts, stops, and provides overload protection for single phase, polyphase and dc motors. The self-indicating handle, interlocked cover that prevents opening unless starter is "off," and safety latch to lock starter "off" during servicing are personnel-protection features. Positive motor-protection is provided by

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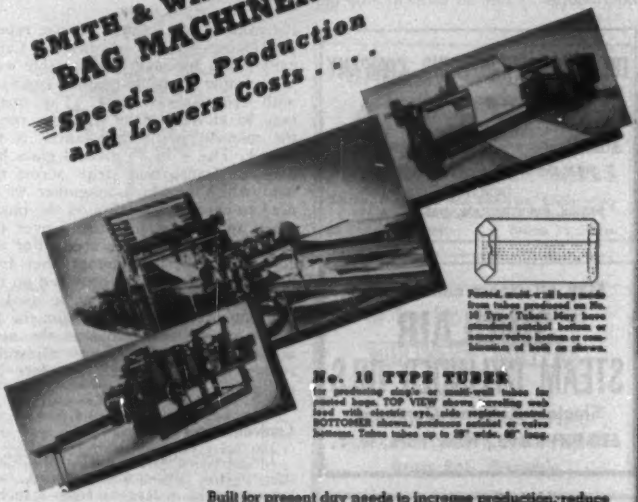
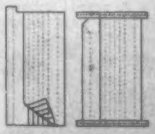
BAG MACHINERY
Speeds up Production
and Lowers Costs . . . .



Pasted, multi-wall bag made from tubes produced on No. 10 Type Tubes. May have standard patched bottom or sewover valve bottom or combination of both as shown.

No. 10 TYPE TUBER
for producing single or multi-wall tubes for pasted bags. TOP VIEW shows 3-rolling web feed with electric eye, side register control. BOTTOMER shows, produces patched or valve bottoms. Tubes tubes up to 28" wide, 60" long.

Built for present day needs to increase production, reduce spoilage and lower unit costs. These machines are custom-made to your requirements and will give continuous, trouble-free service. Increase your profits by speeding up production with Smith & Winchester equipment.



Multi-wall, sewed valve type, gusseted tube made on Smith & Winchester Multi-wall Tuber.

S & W MULTI-WALL TUBER

Up to 100,000 valve notch tubes each 8-hour day may be produced on this Multi-wall Tuber for sewed valve bags. One to 6 walls. Machine built in 2 sizes, 20" and 36" face. Up to 6" gussets. Tubes 28" to 50" long. Improved cross pasting units, photo-electric compensating drives and flying splice paper roll stands can be furnished. If you have a bag problem write us.

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SERVING THE PAPER INDUSTRY SINCE 1850

the quick-make, quick-break, over-center toggle mechanism — De-ion arc-quenching — and the bimetallic disc-type thermal overload relay. Straight-through wiring is designed to facilitate installation and servicing, and Bonderized enclosures prevent blistering, flaking and corroding.

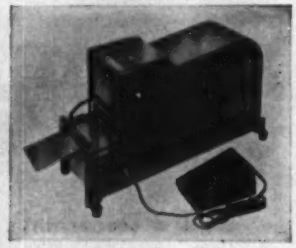
Photomicrographic Camera

A new series of 35 mm. and 4" x 5" photomicrographic cameras has been developed to meet laboratory and clinical needs. All have a unique revolving body feature which permits 360° rotation of the camera backs and eliminates the need for a microscope with an expensive circular revolving stage. A light-tight adapter permits the photographer to swing the camera over or away from the microscope without the need of raising or lowering the camera body or disturbing the focus of the microscope. A fine adjustment stop on

the camera arm assures precise repeat positioning — faster operation. Critically sharp focusing is obtainable with a telescopic focusing eyepiece equipped with cross-hair reticule. The image may be viewed in the telescope up to the moment when the shutter is released. The 4" x 5" ground glass has diagonal transparent strips across the field which enable a magnifier to be used to check the quality of the image when super-critical focusing over the entire plate arm is essential. For the convenience of the photographer four positioning clamps are provided on the base plate. One pair may be used in any one of three positions for the location of the microscope in the most accessible position. Four adjustable rubber vibration absorbers reduce jar or shock to a minimum.

Lectromatic Taper

The Lectromatic Taper, on finger-tip control, dispenses gummed tape automatically in lengths from 2 inches to 40 inches in ½ inch multiples. A dial control on top of machine provides quick, easy setting for tape lengths.



Moistening unit is easy to clean and service. May be equipped with water temperature control unit to insure better moistening of tape under adverse temperature conditions. Available also with electric foot switch which frees both hands for faster wrapping.

STEPHENS-ADAMSON ANNIVERSARY

1951 marks the Stephens-Adamson Manufacturing Co.'s fiftieth year in the production of materials handling equipment at their Aurora, Ill., plant. The company began operations in a single 80x120 ft. building in June of 1901, and today occupies a 13 acre site with 230,000 sq. ft. of plant space. Branch plants are located at Los Angeles, Calif., and Belleville, Ont., Canada, with sales offices in principal cities in the United States and throughout the world.

Through the past fifty years, Stephens-Adamson has made many important contributions to progress in the materials handling field. In 1907, the company equipped the first commercially successful self-unloading bulk freight boat on the Great Lakes. That same ship is still in service today, along with a large fleet of others similarly equipped by S-A.

By 1910, S-A had built a bucket elevator rated at 1000 tons per hour. It has been handling a million tons a year ever since. Anti-friction, ball bearing equipped, belt conveyor carriers were introduced in 1911 to overcome the excessive power demands of early belt conveyors.

The centrifugal box car loader was introduced in 1927. This unit has revolutionized loading methods for bulk materials shipped in box cars and has been adapted for many special applications, both fixed and portable. Mounted on gantries at dockside, these units are loading and trimming ships in ports throughout the world.

In 1929 the company engineered and built the conveying and screening equipment for one of the country's largest limestone plants. Huge traveling stackers discharge belt conveyors, forming long storage piles of various sizes of crushed stone. Tunnel conveyors under the piles recover the stone at a rate of 4000 tons per hour.

Stephens-Adamson introduced the "en masse" Redler conveyor in 1932, finding a tremendous demand in the chemical and food industries. Skeleton flights, operating in a totally enclosed casing, were used to convey and elevate without dust, or contamination. Another S-A development in the early "thirties" was the circular bin discharger. This unit is designed to unload materials, which tend to arch over bin openings, or aerate and flow out too rapidly. A large chemical plant has 75 of these dischargers in operation, guaranteeing a steady flow of material to the conveying system.

Long aware of the importance of good bearings in improving conveyor performance, S-A began producing its own bearings in 1938. The Sealmaster ball bearing unit is now produced in a modern plant completed in 1946 and is used not only on all S-A machinery, but distributed throughout the world.

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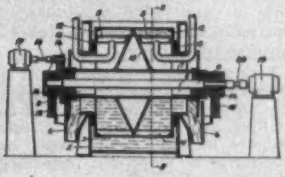
Patent Abstracts

● ***In addition to abstracts on the technology of pulp, paper and related industries, miscellaneous abstracts which may provide useful information are included.***

U.S. 2,532,196—Floor or Wall Covering and Method of Making the Same. William Rowe, Lewiston, Maine, assignor to Bonafide Mills, Inc., Lisbon, Maine. Filed February 17, 1948—Issued November 28, 1950.

A coated sheet comprising a base sheet covered with a coating composition comprising the blended product resulting from heating at a temperature not exceeding 300° F. a drying oil pitch and a viscous petroleum polymer having a molecular weight between 200 and 600 and consisting principally of polymerized olifinic hydrocarbons characterized by a high degree of unsaturation, and an iodine number of between 80 and 200 and being substantially non-acid and non-saponifiable, said blended product being substantially free from vulcanizing agents and being capable of curing with more rapidity than the drying pitch, and being highly resistant to moisture, acids, alkalies and mineral oils.

U.S. 2,532,415 — Rotary Screening Drum. Karl Roland Lindblad, Sundsbruk, Sweden, assignor to Svenska Cellulosa Aktiebolaget, Stockholm, Sweden. Filed April 19, 1946—Issued December 5, 1950.

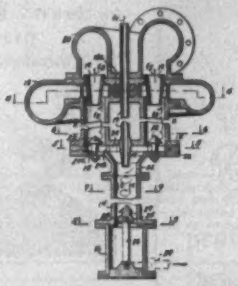


Apparatus for screening liquid suspensions such as a fibrous suspension comprising a trough for receiving the suspension, a screening drum in said trough adapted to be at least partly immersed in the suspension and being provided with an outlet for screened material in at least one end wall thereof, a hollow shaft arranged coaxially with and extending through and supporting said drum, elastic journals at opposite sides of said drum mounting said shaft, said journals being axially aligned with the common axis of said shaft and drum means for rotating said shaft, a second shaft arranged coaxially within said hollow shaft, said second shaft being loaded eccentrically with respect to its axis, bearing means carried by said hollow shaft for journalling said eccentrically loaded shaft, and means for rotating the latter to thereby impart vibratory motion to said hollow shaft and drum through said bearing means.

U.S. 2,532,479—Method and Machine for Gluing and Folding Paper Boxes. Frank H. Burgess, Philadelphia, Pa. Filed January 8, 1947—Issued December 5, 1950.

A machine for folding and gluing paper box blanks, said blanks comprising bottom portions, side walls, end walls and oppositely projecting ears extending from two of said walls, which machine comprises pairs of spaced glue-applying means, plungers to force a blank between said glue-applying means so that glue is applied to the blank's ears and said ears are simultaneously folded angularly from the plane of the blank, whereby they are capable of being folded between said intervening walls, a spaced pair of blank bottom-folding rolls, a pair of pilot rolls, a central plunger to successively force the blank between and past said folding and pilot rolls, a pair of oppositely inwardly extending stationary folders to reversely fold as gussets the ends of the blank inwardly and the blank's ears between its other walls, and means to thereafter compress the blank so that the glued ears adhere to the blank's intervening walls.

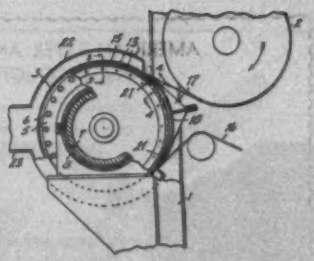
U.S. 2,532,885—Vortex Type Separator for Paper Pulp. André Charles Bergès, Mimisan-Plage, France. Filed April 9, 1948—Issued December 5, 1950.



A vortex type separator for paper pulp, comprising an upright cylindrical collecting chamber open at its upper end, a base plate mounted on top of the collecting chamber and having therein a central circular opening constituting an upward continuation of the collecting chamber, a plurality of upright cylindrical vortex vessels mounted on the base plate and grouped closely around the central opening therein, each vortex vessel having, at its upper end, a tangential inlet for introducing pulp under pressure into the vessel and a central outlet for withdrawing purified pulp from the vessel in an upward direction, having a blind lower end containing a central upstanding baffle defining, with the inner wall of the vessel, an annular dirt-collecting zone and having at its lower end a side outlet for discharging dirt-laden liquid tangentially from its annular dirt-collecting zone into the central opening in said base plate and thence into the upper end of the collecting chamber, and a central outlet at the upper end of the collecting chamber for withdrawing upwardly therefrom good stock which may be separated from the dirt as the result of vortex formation in the collecting chamber.

U.S. 2,532,910—Apparatus for Drying Paper, Paperboard, Pulp, and the Like. Ralph A. Hayward, Parchment, Mich., assignor to Kalamazoo Vegetable Parchment Company, Parchment, Mich. Filed September 2, 1947—Issued December 5, 1950.

A drying roll adapted to be mounted in a paper drying machine comprising a hollow cylindrical roll member defining a plurality of radially extending apertures opening to the outer surface thereof, and counter-sunk at their outer ends, the outer surface of said roll member being spirally grooved, a wrapper wire wound in said spiral groove and projecting thereabove by one-half the thickness of said wire, the pitch of said spiral



groove and wire being slightly greater than the diameter of the wire whereby several successive turns of the wire bridge each of the countersunk ends of said apertures in transversely spaced relationship, a hollow roll end member secured to one end of said roll member and forming a hollow journal adapted to the supported in said machine, a rotating gland member secured to the end of said journal, and a vacuum pipe communicating with said hollow journal and having a fixed gland cooperating with said rotating gland member.

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AMERICAN PAPER AND PULP ASSOCIATION'S PAPER PRODUCTION RATIO REPORT

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

	Dec. 2	Dec. 9	Dec. 16	Dec. 23	Dec. 30
1950	104.1	106.8	106.1	102.8r	74.9
	Dec. 3	**Dec. 10**	**Dec. 17**	**Dec. 24**	**Dec. 31**
1949	*99.5*	*99.9*	*98.7*	*87.9*	*72.7*

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1949	*94.6*	*92.8*	*89.1*	*85.1*	*82.7*	*78.6*	*72.8*	*87.6*	*89.7*	*96.0*	*98.2*	*89.8*	*88.0*
1950	97.6	100.8	101.9	100.5	100.8‡	103.2‡	90.8‡	105.8‡	101.7‡	106.7‡	105.8‡	99.2‡	

r Revised.
‡ Preliminary.

COMPARATIVE YEARLY SUMMARIES

	1943	1944	1945	1946	1947	1948	1949	1950
Year to Date	87.8	88.1	89.7	101.4	104.9	96.7	88.6	101.7
Year Average	87.8	88.1	89.4	100.1	104.3	86.2	88.0	

PAPERBOARD OPERATING RATIOS†

	Dec. 2	Dec. 9	Dec. 16	Dec. 23	Dec. 30
1950	101	106	105	103	63
	Dec. 3	**Dec. 10**	**Dec. 17**	**Dec. 24**	**Dec. 31**
1949	*93*	*96*	*92*	*92*	*53*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1949	*88*	*85*	*79*	*79*	*78*	*75*	*64*	*86*	*87*	*94*	*91*	*83*	*83*
1950	88	92	91	92	91	94	82	100	96	102	101	95	

All of the above data is based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.
† Per cents of operation based on "Inch-Hours" reported to the National Paperboard Association.

U.S. 2,532,923 — Method of Making Paper Yarn. Harry D. Kitchen, Grand Rapids, Mich., assignor to Sackner Products, Inc. Filed January 24, 1949 — Issued December 5, 1950.

The method of making paper yarn comprising the steps of crumpling and compressing a strip of paper into a strand of generally cylindrical section, further compressing and conforming the strand into a flattened section of substantially uniform width and thickness, forming a colored stripe on one side of the flattened strand and at one side of the longitudinal center thereof, and twisting the flattened strand into a yarn with the stripe on the outer side thereof, the stripe when the strand is twisted forming a spiral stripe on the surface of the yarn.

U.S. 2,533,070 — Carton. Walter J. Tyrseck, Montville, Conn., assignor to Robertson Paper Box Company Incorporated, Montville, Conn. Filed October 26, 1949 — Issued December 5, 1950.

A shock-proof box formed of a single blank, comprising a plurality of aligned successive panels folded around each other in one direction only and forming an inner sleeve and an outer sleeve surrounding the same, the inner sleeve including four successive panels forming a rectangular structure and a fifth panel connected to the fourth such panel and overlying the inner surface of the first such panel, the said fifth inner sleeve panel having a projection extending outwardly from its fold line to engage the outer sleeve and having its edge substantially in engagement with the second inner sleeve panel, for maintaining the fold line between the fourth inner sleeve panel and the said fifth inner sleeve panel in position widthwise of the first inner sleeve panel.

U.S. 2,533,145 — Stereotype Mat. Arlie William Schorger, Madison, Wis., assignor to Burgess Celluolse Company, Freeport, Ill. Filed April 13, 1948 — Issued December 5, 1950.

A stereotype mat of inter-bonded felted fibers and containing in the body thereof a water insoluble hydroxyalkyl ether of cellulose from ethyl to propyl inclusive, the proportion of said ether being such that there are from 0.25 to 1.5 hydroxyalkyl radicals to each unit of cellulose.

U.S. 2,533,199 — Hydraulic Seal for Pulp Refining Mills. Cyrus E. Roberson, Hoosick Falls, N. Y., assignor to The Noble & Wood Machine Company, Hoosick Falls, N. Y. Filed January 9, 1947 — Issued December 5, 1950.

In stuff treating apparatus having a stator and a rotor and in which the rotor is provided in its end face with an annular groove to contain a sealing fluid, an annular plate fixed to the end face of the rotor with its inner end projecting into said groove and spaced from the bottom of the groove, an annular adjusting plate slidably mounted upon the stator for adjustment in an axial direction relative to said first-named plate and having in its end face a recess, a U-shaped sealing ring one leg of which is mounted within said recess in juxtaposition to said first-named

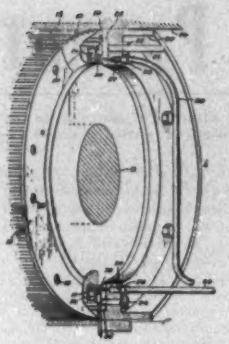


plate and the other leg of which extends inwardly beneath the inner end of said first-named plate in spaced relation thereto and thence extends upwardly into said groove, said last-named leg being of less area than said groove and being spaced from the groove walls and from said first-named plate to provide a tortuous path for sealing fluid contained in said groove when the same is forced outwardly towards said first-named plate and towards the first-named leg of said sealing ring by the centrifugal force developed by the rotor when in operation, and means for introducing a sealing fluid into said groove as required.

JAPAN'S DYE SITUATION

WASHINGTON, D. C. — A threat that Japan may have to curtail or halt exports of dyes, due to home needs, is reported to this Government, based on Japanese trade reports.

A sharp drop in production of dye intermediates in Japan, it was reported, may affect output and export of coal tar dyes, and unless supplies of intermediates increase, sales abroad may necessarily be suspended temporarily.

OBITUARIES

Eugene J. Cooper, 59, part owner of the Hudson Valley Paper Co., Albany, N. Y. and the Troy Paper Corp., died January 4 in his home at White Plains, N. Y. He had New York offices at 280 Madison Avenue. His widow, Violetta Rutherford Cooper, survives.

Boyd Daugherty, for many years head of the Bemis Bro. Bag Co. sales office in New York, died December 30 at Port Washington, L. I., N. Y. Mr. Daugherty, better known as "Pat" among his many friends in the trade, resigned his position in March, 1945 due to ill health and spent the past five years in retirement at his home in Port Washington. He joined Bemis in 1913 as a salesman in Chicago and in 1914 transferred to New York. He became head of the New York sales office in 1926.

John B. Rowe, 52, president of the Thorold Pulp Co. of Thorold, Ont., died at Rochester General Hospital December 31. His widow and two daughters survive.

BOARD MILL SCREENS

Probably more Board Mill Screens are equipped with **Fitchburg NEW TYPE-DUPLEX SLOT Screen Plates** than any other type of plate.

High capacity . . . permanent true slot alignment . . . Freedom from "strings" and plugged-up slots.

Get a full day's work from your screens with these remarkable plates. Furnished in tough, "Fitchburg Bronze," plain or chromium plated.

FITCHBURG
Screen Plate Co., Inc.
301 South Street
Fitchburg
Massachusetts

Clinton's

PM 3011
Pearl Starch

(For enzyme conversion)

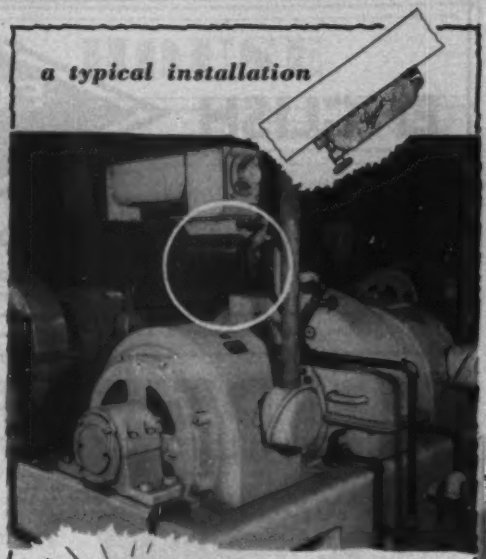
● Specifically processed and controlled for ease of conversion under all practical mill conditions. Also, special grades of starch for:

- BEATERS
- COATING
- LAMINATING
- TUBSIZING

CLINTON

CLINTON FOODS INC., CLINTON, IOWA

a typical installation



Bauer

magnetic separators protect machinery and product

The photograph shows a Bauer Triple-Air-Gap Permanent Magnetic Separator installed in the chute which feeds chips to a Bauer Pulp Refiner. Obviously, the purpose of the separator is to catch tramp iron and steel.

In removing a single large ferrous object during a whole lifetime of service, a Bauer Magnetic Separator can pay for itself by averting damage to an expensive machine. Less spectacular, Bauer Separators save the product from contamination by attracting the smallest ferrous particles.

In addition to the magnetic separator shown here, the Bauer line includes three other models. All are illustrated and described in Bulletin M-3-A which also explains the superior performance of Bauer Separators in the steel ball test. This is highly interesting and important.

Since you associate our company with Bauer Pulp Refiners and Bauer-McNett Classifiers, you may be surprised to know that we pioneered the use of Alnico in permanent magnetic separators 13 years ago. The Triple-Air-Gap design is a patented Bauer feature. Other magnetic separator accomplishments include the new Bauer magnetic grate.

So you'll want our bulletin on Permanent Magnetic Separators. Be sure to ask for a copy. Write, phone, or wire.

THE BAUER BROS. CO.
1738 Sheridan Ave., Springfield, Ohio

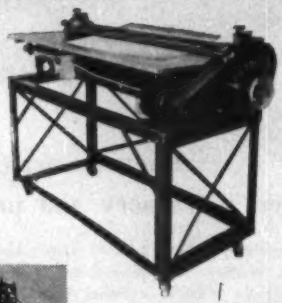
ENGLISH ECCO CLAYS CLAYS

ECCO CLAYS TRADE MARK

UNIFORM SUPERIOR DEPENDABLE

English China Clays Sales Corporation
551 Fifth Avenue, New York City

POTDEVIN
GLUERS FOR MILL-ROLL HEADERS



Heavy duty 39 or 46 inch POTDEVIN GLUERS handle your header labels efficiently and speedily. Patented regulator applies a controlled film of glue—for strong, all-over adhesion to insure a tightly sealed wrapper. Ball-bearing casters permit moving the POTDEVIN to the rolls being "headed".

Write for full particulars on POTDEVIN Gluers and other equipment for the Paper Trade.

POTDEVIN MACHINE CO.
1223 38th Street, Brooklyn 18, N. Y.

Designers and manufacturers since 1893 of equipment for Bag Making, Printing, Coating, Gluing and Labeling

POTDEVIN

WEST VIRGINIA
PULP and PAPER COMPANY

230 Park Ave.
New York 17, N. Y.

35 East Wacker Drive
Chicago 1, Ill.

Lincoln-Liberty Bldg.
Philadelphia 7, Pa.

503 Market St.
San Francisco 5, Calif.

Manufacturers of West Virginia Mill Brand Papers

SUPERCALENDERED	ENVELOPE
ENGLISH FINISH	MIMEOGRAPH
LITHOGRAPH	INDEX BRISTOL
LABEL	POST CARD
OFFSET	COVER
EGGSHELL	CUP AND CONTAINER
MUSIC	FILE FOLDER
POSTER	TAG
BOND	COATED
WRITING	MACHINE COATED

KRAFT LINER BOARD
KRAFT CONVERTING AND KRAFT ENVELOPE

MILLS

Mechanicville, New York
Luke, Maryland
Covington, Virginia
Tyrone, Pennsylvania
Williamsburg, Pennsylvania
Charleston, South Carolina

EXCELSIOR FELTS & JACKETS

"EXCELSIOR" FELTS

The Trademark of Felts of Superior Quality for Every Grade of Pulp and Paper

KNOX WOOLEN COMPANY
CAMDEN, MAINE

CLEARING HOUSE

HELP WANTED

MEN WANTED
POSITIONS OPEN

We can place—managers, superintendents and assistant managers for paper, pulp and board mills and roofing felt plants; superintendents and foremen for coating depts.; converting and consulting engineers; cost accountants, time study men.

Chemists, chemical engineers and laboratory men; master mechanics, draftsmen, designers, mechanical and plant engineers also millwrights and machinists for mills, also for companies building paper mill machinery; salesmen for paper-pulp machinery; tour bosses (Cylinder and Fourdrinier machines); machine tenders and back tenders.

LIST YOUR CONFIDENTIAL APPLICATION WITH US. We will keep you informed of attractive positions open in the pulp and paper mills.

CHARLES P. RAYMOND SERVICE, Inc.
294 Washington St. Boston 8, Mass.
SPECIALISTS IN PLACING PULP AND PAPER MILL EXECUTIVES J-12

Chemist — with paper coatings experience wanted by lithographic industry in Midwest, for quality control in laboratory and mill. Send complete resume. Address Box 50-620 care Paper Trade Journal. J-12 J-12

PRODUCTION CHIEF

Paper converting, nationally known. Printing, coating, gumming, laminating, finishing operations. Lifetime position for top-flight production executive. Our people know of this ad. Send full details confidentially to President, Box 50-443, care Paper Trade Journal. TF

WANTED

Night Superintendent to take full charge of two-machine Mill making Sulphite and Rag Content Papers. Must be experienced, aggressive, honest, and dependable. In application, state complete details and references. Excellent opportunity for an ambitious man. Write Box No. 50-625 care Paper Trade Journal J-19

"A position will be open in the near future for a first class super calender operator in a west coast paper mill. Must have sufficient experience to be capable of handling job and training others. In reply give full details, including references. Reply Box 51-8 C/O Paper Trade Journal." J-12

BACK TENDER AND BEATER ENGINEERS—Must be thoroughly experienced on folding and set-up boards. Steady work, excellent pay. Miami Paper Board Mills, Inc., P. O. Box 97, Int'l Airport, Miami, 48, Fla. J-12

WORKING SUPERINTENDENT for small, fast growing Eastern mill making lightweight specialties. Cylinder machine experience essential. State qualifications and salary expected. Address Box 50-378 care Paper Trade Journal. TF

HELP WANTED

SALARIED POSITIONS $3,500 to $35,000. We offer the original personal employment service (established 41 years). Procedure of highest ethical standards in individualized to your personal requirements. Identity covered; present position protected. Ask for particulars. E. W. DIXEY, INC. —117 Dun Bldg., Buffalo, 2, N. Y. TF

MACHINE TENDER—Qualified on high grade folding boxboards. High pay rate—pleasant working conditions. Address Box 50-586 care Paper Trade Journal. J-12

TOUR BOSS wanted for Board Mill in East. Must have experience on folding grades. Address Box 50-475 care Paper Trade Journal. TF

WANTED — SALES ENGINEER — Experienced in Pulp and Paper Mills, for sales and service work. Excellent opportunity with old established machinery manufacturer. In reply, give resume of education, experience and current salary. Address Box 50-513 care Paper Trade Journal. TF

ENGINEERING DRAFTSMEN (2), under forty, some experience in pulp and paper industry, for large mill in South. Submit resume to Box 50-623 care Paper Trade Journal. J-12

CHEMICAL ENGINEER to fill position of Assistant Quality Control Supervisor in large fiber insulation board manufacturing plant, located in South. All replies confidential. Our personnel know of this ad. Address Box 50-621 care Paper Trade Journal. J-19

WANTED—MASTER MECHANIC for one machine mill making Folding Grades. Good salary and good working conditions. Contact R. E. STEARNS, Empire Box Corp., of Stroudsburg, P. O. Box 54, Stroudsburg, Pennsylvania. J-12

WORKING SUPERINTENDENT for small napkin converting plant. Knowledge of printing essential. State salary, experience, etc. Address Box 51-4 care Paper Trade Journal. J-26

WANTED: DESIGN AND PROJECT ENGINEER—California. 3 to 15 years experience and engineering degree. Experience in insulations, floorcoverings, roofings, building materials and paper mills preferred. Competitive salary depending upon individual qualifications. Address Box 51-11 care Paper Trade Journal. J-19

A
WORKING SUPERINTENDENT
and a
MASTER MECHANIC
wanted in New Jersey.
Cylinder Machine.
Address Box 51-18 care Paper Trade Journal. J-26

SITUATIONS WANTED

PLANT MANAGER—Manufacture and conversion of boards and papers; waste change for greater opportunity. Competent and successful in organization; production; and labor relations. Address Box 50-521 care Paper Trade Journal. J-26

SITUATIONS WANTED

DEVELOPMENT AND SALES ENGINEER

Technical and practical training, converting experience, all grades and weights of paper, large or small mill.

Address Box 51-13, care Paper Trade Journal. J-19

KRAFT PULP MILL MAN IS AVAILABLE NOW WHO HAS YEARS OF SUCCESSFUL PRODUCTION AND TECHNICAL CONTROL EXPERIENCE. ANY-ONE INTERESTED PLEASE ADDRESS BOX 51-7 care Paper Trade Journal. J-26

ROPE & INSULATING PAPERS—Desire position sales engineer or production. Can furnish full manufacturing data. Address Box 51-12 care Paper Trade Journal. J-12

MILL SUPERINTENDENT with proven ability in conventional or Yankee Fourdrinier Mill manufacturing light or heavy weight Kraft or sulphite specialty grades. Desires new connection. Address Box 51-14 care Paper Trade Journal. J-12

SALES REPRESENTATIVE covering Philadelphia, Eastern Pennsylvania and surrounding territory, desires line of Toilet Tissue, Napkins, Towels. Paper and paper products on a commission basis. Address Box 51-15, care Paper Trade Journal. J-12

FOR SALE

COMPLETE

SUBJECT TO PRIOR SALE

84" Trim Machine, including:
Brownell Engine (new parts, overhauled, like new), Three (3) beaters (with motors) Stock Chest (with motors and agitators) Three (3) Noble and Wood Jordans (with motors), Piping, Mixing Boxes, Three (3) Primary Presses, Three (3) Secondary Presses, Complete Felt Section, including Gilbert and Nash Guides, Broughton Showers, Two (2) Calender Stacks (Sandy Hill nine roll stack and Farrel Birmingham nine roll stack), One (1) Dunnington Duplex Sheeter complete with drive, all drives for complete paper machine are Bagley and Sewall Bevel Gears. Complete line shaft, including hangers, bearings and pulleys, Two complete sets extractor rolls, air ducts and piping.

Extra spare Felt Rolls, Extra Primary Press Rolls, Extra Secondary Press Rolls.

This machine may be equipped for either a Cylinder or Fourdrinier type machine.

We have on hand many auxiliary and spare parts for this equipment, including pumps, motors, piping, valves, wiring, electrical equipment etc. Auxiliary equipment too numerous to mention.

We have everything for the complete machine, with the exception of screens, dryers and wet end.

This can be inspected by appointment only, ask for Mr. Arthur Alcombrack, telephone Hoosick Falls 90. Will sell very cheap, package deal.

Thomas A. Galante and Sons, Inc.
Wallkomoo Paper Mills, Division
P. O. North Hoosick, New York TF

RATES FOR CLEARING HOUSE ADVERTISING

HELP WANTED—10c a word. Double rate for heavy face type. Minimum charge $2.00.

SITUATIONS WANTED—10c a word, double rate for heavy face type. Minimum charge $2.00. If repeated ½ rate will be charged for each consecutive repetition.

FOR SALE—10c a word. Double rate for heavy face type. Minimum charge $2.00.

WANTED—10c a word. Double rate for heavy face type. Minimum charge $2.00.

OPPORTUNITIES—10c a word. Double rate for heavy face type. Minimum charge $2.00.

Classified advertising space may also be purchased at $5.00 per single column inch. All classified advertisements are payable in advance.

If box number is used—70 cents additional.

Address replies to advertisements appearing under Box Numbers in care of PAPER TRADE JOURNAL, 15 West 47th Street, New York 19, N. Y.

FOR SALE

FOR SALE

32" Cameron model 24-3A Slitter.
48" Kidder model CH shear cut Slitter.
52" Hobbs Box Slitter.
44" Book Sheeter with 10-roll back-stand and layboy.
36" Hamblet Sheeter.
58" Finley Sheeter.
1050" Horne single-knife Sheeter.
60" Geuppo mill type Power Cutter.
36" Acme & 40" C. & P. Automatic Power Paper Cutters.
36 x 48 Kidder one-color Rotary.
3-color Cottrell 22½ Bag Press.
Model B Cleveland Folder with continuous feeder.
Extension Delivery for 6-0 or 5-0 Miehle.
No. 3 Smyth Book Sewer.
16 and 24-page Newspaper Presses.

THOMAS W. HALL COMPANY, Inc.
120 West 42nd St., New York 18
(Plant at Stamford, Conn.)
TF

PAPER COATING MACHINERY MANUFACTURERS — Waxing, Oiling, Carbon, Laboratory Coating and Treating and Flat Ream Measuring and Converting Machines. New improvement. THE MAYER MACHINE COMPANY, INC., 1313 Buffalo Road, Rochester, 11, N. Y. TF

FOR SALE

1—250 H.P., 514 R.P.M., Allis-Chalmers motor, 8 P.F., direct connected exciter, sleeve bearing.

SHARTLE BROS. MACHINE CO.
Middletown, Ohio
J-11

FOR SALE

Five Cylinder Board Machine, Trim 60".

Box 51-5, C/O Paper Trade Journal
J-11

FOR SALE—64" Seybold Full Automatic Power Paper Cutter; 36" Beck and 48" Kidder Sheeter with Layboy; 26" x 38" Thomson Platen Die Cutter; 36" Waldron Rotary Embosser. Write for Bulletin "K" listing over 170 Boxboard Container and Paper Converting Machines—For immediate delivery. GREGORY INC., 203 No. Wabash Ave., Chicago, 1, Illinois. TF

FOR SALE

2—84" 9-roll Supercalender Stacks. Complete with drives.

J. J. ROSS COMPANY
250 Frelinghuysen Ave., Newark, N. J.
Tel. Bigelow 3-3720
J-12

FOR SALE—84" Seybold 20th Century Automatic mill type Power Cutter. Available immediately. Address Box 51-10 care Paper Trade Journal. J-12

FOR SALE—Long term chlorine and caustic contracts wanted start second or third quarter. Address Box 51-17, care Paper Trade Journal. J-12

FOR SALE—44" Cameron Style 6 Model 1A Slitter and Rewinder with ten sets of slitters. Address Box 51-9 care Paper Trade Journal. J-12

WANTED

WANTED—1—300 H.P. Synchronous Motor 80% Power Factor, 3 phase, 60 cycle. Reply to Saugamon Paper Mills, Inc., 137 W Pershing Road, Chicago, 9, Ill. J-19

FOR SALE

1—112" Cameron, Type 18, 60" rewind.

BEATERS
1—1½ lb. Laboratory Beater.
1—300 lb. Beater—iron tub.
1—Ditto Iron Tub Laboratory Beater. Beater roll 14" diameter x 10½" face, including motor.

CALENDER STACKS
1—72" 5 roll Calender Stack.
1—2 roll pressure calender—32" x 108".
1—72" 4 roll calender stack. (Extra heavy duty).

CHIPPER
1—96" Murray 4 knife Chipper—anti-friction bearings.

CRUSHER & HAMMERMILL
1—Murray Chip Crusher.
1—Jeffrey Hammermill.

CYLINDER MOLDS
1—39" diameter x 72" face.
1—76" diameter x 70" face.
2—16" diameter x 54" face.
1—48" diameter x 117" face.
1—36" diameter x 96" face.

DIGESTERS
2—14 ft. Rotary Digesters.

DRIVES
1—22½ Reeves Drive.
1—24 Reeves Drive
1—Reliance Electric Drive, complete with 5 gear head motors.
2—23 Reeves Drives (totally enclosed).

V-BELT DRIVE
1—21½" diameter x 7½" face, 5 groove.
1—16½" diameter x 7½" face, 5 groove. (With clutch).

DRYERS
1—Complete unit, consisting of 6 dryers, 36" diameter x 38" face, including frames, gears, anti-friction bearings.
7—Copper faced Dryers 60" diameter x 72" face, including frames, gears, etc.
7—24" diameter x 48" face.
4—36" diameter x 72½" face, with gears and bearings.
1—48" diameter x 91" face.
3—36" diameter x 96½" face.
1—36" diameter x 143" face.
1—24" diameter x 130" face.
1—48" diameter x 70" face.
2—48" diameter x 82" face.
1—48" diameter x 82" face.
12—36" diameter x 70" face—complete with bearings, gears & frames.
2—Dryers 48" diameter x 134" face.

FELT CONDITIONER
1—140" Nash Felt Conditioner.

FLAT SCREENS
1—6 plate Shartle Flat Screen
4—Packer, 12 plate, roller shoe type.

FRAMES
Vertical frames for 100 dryers, 48" diameter, with bearings.

JORDANS
1—Horne Jordan.
2—Noble & Wood Mammoth.

LIME SLUDGE FILTERS
3—IMPCO Lime Sludge Filters, vacuum type, 8' diameter x 4' face.

MISCELLANEOUS
1—Caustic Mixer.

MOTORS
1—125 h.p., 1700 r.p.m.
1—50 h.p., 880 r.p.m.
Write us regarding your requirements.

PRESSES
3—Sets Primary Presses, complete, 149" face. Anti-friction bearings. Also all types of rolls for 149" wet end.

PULLEYS
Various sizes and assorted pulleys.

PULP BALER
1—200 ton hydraulic Pulp Baler. (Practically new).

PULPERS
1—Jones Pulper. Complete with motor and drive.
1—Noble & Wood Pulper—Iron Tub.

PULP PRESSES
2—Pulp Presses 78" wide (Kamyr Type).

PUMPS
Various sizes of Centrifugal and Plunger Pumps. Write us regarding your particular requirements.

REEL
1—104" Beloit two bowl reel.

ROLLS
Felt, Table, Press, Breast, Couch, etc. Various sizes and types. (Bronze, Rubber, Iron, etc.)

ROTARY SCREENS
1—22 Bird Rotary Screen.
1—23A Bird Rotary Screen.
3—23A Cylinders, only (for Bird Rotary Screens). (Chrome plate).

SHEETERS
1—139" Moore & White Sheeter, duplex. with layboy.
2—36" Sheeters.
2—40" Sheeters.
2—36" Sheeters.
1—44" Hamblet Sheeter, rebuilt.
1—84" Hamblet.

SHREDDERS
2—Daniels Rag Cutters.
1—Taylor-Stiles Giant Shredder, portable.

SLITTERS & WINDERS
1—42" Cameron—Type 40-4-B.
2—42" Cameron—Type 24-2-A.
1—42" Cameron—Type 9-S.
1—118" 2 drum Waldron
2—112" Cameron—Type 18.
1—104" Beloit two drum winder.
1—42" Cameron Constant Tension with pneumatic control.
1—42" Cameron—Type 6.
1—52" Cameron—Type 8-S.
1—42" Cameron—Type 24-3A.
1—62" Cameron—Type 26-3A.

STOCK PUMPS
1—10 x 20 Shartle Duplex.
1—7 x 16 Shartle Duplex.
1—7 x 16 Shartle Triplex.
1—10 x 20 Shartle Triplex.
Advise us to your requirements.

SUCTION BOXES
5—Suction Boxes, 82" drilled face x 6" wide.

SUCTION COUCH ROLL
1—Sandusky 14½" dia. x 102" drilled face.

VACUUM PUMPS
1—23 Nash Hytor.
1—21 Nash Hytor.

VAT
1—Iron end Vat only, for docker or sevall, suitable for cylinder mold 36 x 130.

WAXING MACHINES
1—80" Potdevin Waxing Machine.

We are always in the market to purchase your surplus or idle machinery. What have you to offer? Wanted Cylinder and Fourdrinier Machines (complete mills).

Paddy Ross, Pres. **J. J. ROSS COMPANY** Ben Kurz, Treas.
250 Frelinghuysen Ave. Tel.—Bigelow 3-3720 Newark 5, N. J.

WANTED

WANTED

1—60 H.P. Motor, 440 volts, 60 cycles 3 phase, 490 RPM.

1—150 H.P. Motor, 580 RPM, Full load, 440 volt, 3 phase, 60 cycle, totally enclosed.

1—75½ H.P. Motor, 580 RPM. full load, 440 volt, 3 phase, 60 cycle.

Address replies to Sangamon Paper Mills, Inc., 137 W. Pershing Road, Chicago 9, Illinois. J-12

WANTED—USED MOTORS

2—150 or 175 H.P., 440 volt, 3 phase, 60 cycle, 450 RPM motors, including starting compensators and contactor boards. Exciters not needed.

OR

2—175 H.P. squirrel cage 440 volt, 3 phase, 60 cycle, 450 motors, with starting compensators.

We can offer for sale or exchange two 550 volt motors to be released after purchase and installation of the 440 volt motors. Further details on request. In replying please give full information on 440 volt motors including price. Reply Box 50-604 care Paper Trade Journal. F-2

WANTED—W & P Shredders, Evaporators. Generators and Boilers, Slitters, Cutters. Hydraulic presses, Sheridan Presses, Dryers. Address Box 50-18 care Paper Trade Journal. TF

WANTED

PAPER WANTED—ALL KINDS GLASSINE, WAX, PARCHMENT, WAXING, SULPHITES, TISSUES, M G, KRAFT, ODD LOTS, OBSOLETE STOCK, SIDE ROLLS, SIDE SHEETS. LARGER THE QUANTITY THE BETTER

BLEYCO PAPER CORP.
419 W. 55th St., New York, #19
J-12

WANTED

Serviceable Grocery Bag Machine
8 through 20 lb. sizes.
Recent Model Potdevin preferred.

Address Box 50-450, care Paper Trade Journal. TF

WANTED—Sheathing Building, Waterproof Papers, Large Quantities, put up in 36" width rolls, containing 500 square feet. Send offers to Box 51-3 care Paper Trade Journal. J-12

WANTED—Brightwood Box Machine, Shredders, Evaporators, Generators and Boilers, Slitters, Cutters, Hydraulic presses, Sheridan Presses, Dryers. Address Box 50-193 care Paper Trade Journal. TF

WANTED

WANTED

Side-runs paper from basis 60-lb. to 120-lb. in rolls 6½" or wider, large diameter, in Book, Kraft, Groundwood-White, Pastel or Light Colors.

J. P. AUER, INC. MAMARONECK, N. Y. J-26

Join
MARCH OF DIMES

JANUARY

	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

University of Maine

Lectures on Pulp and Paper Manufacture

$5.00

Limited Quantity

Lockwood Trade Journal Co., Inc. 15 W. 47th St., New York 19, N. Y.

MISCO
STAINLESS STEEL CASTINGS
for all equipment exposed to corrosion by sulphite acids or other corrosive agents
MICHIGAN STEEL CASTING CO., DETROIT 7, MICH.

APPLETON FELTS
APPLETON WOOLEN MILLS
APPLETON WISCONSIN

CALENDER & EMBOSSING ROLLS
BUILT-REBUILT-RECONDITIONED

Building the finest calender and embossing rolls to your specifications is a Wheeler specialty—backed by 20 years experience. Calender and embossing rolls up to 240 inches built or reconditioned. Complete technical department at your service.

THE WHEELER ROLL CO.
1910 LANE BLVD KALAMAZOO, MICH

WHERE TO BUY

ABRASIVES
Monsanto Chemical Co.
Norton Co.

ADHESIVES
American Cyanamid Company Plastics & Resins Division
E. I. Du Pont De Nemours & Co., Inc.
The Goodyear Tire & Rubber Company
Monsanto Chemical Co.
National Starch Products, Inc.
Nopco Chemical Co.
Paisley Products, Inc.
Stein, Hall & Co., Inc.

AGITATORS
American Paper Machy. & Engrg. Works, Inc.
Appleton Machine Co.
The Cowles Company
Dilts Machine Works, Inc.
Dorr Company
Downingtown Mfg. Co.
Hardinge Company, Inc.
E. D. Jones & Sons Co.
D. J. Murray Mfg. Co.
Moore & White Co.
The Sandy Hill Iron & Brass Works
Valley Iron Works Co.
Shartle Brothers Machine Co.

ADJUSTABLE SHAKE MOTION
Manchester Machine Co.

ADJUSTABLE TILTING MOTOR BASE
Lovejoy Flexible Coupling Co.

ALLOYS
Michigan Steel Casting Co.

ANTIFOAM
American Cyanamid Company Industrial Chemicals Division
National Aluminate Corp.
Nopco Chemical Co.

APRON CLOTH
Williams-Gray Co.

BAG MACHINES
Dilts Machine Works
Poolevin Machine Co.
The Sandy Hill Iron & Brass Works
Smith Winchester Mfg. Co.
Weber, Herman G., & Co., Inc.

BALL MILLS
F. L. Smidth & Co.

BARK BURNER
Nichols Engrg. & Research Corp.

BARK PRESS
American Defibrator Co.

BARKERS AND CHIPPERS
Allis-Chalmers Mfg. Co.
Appleton Machine Co.
Carthage Machine Co.
D. J. Murray Mfg. Co.
Valley Iron Works Co.

BARS
Dilts Machine Works
E. D. Jones & Sons Co.
The Moore & White Co.
Shartle Brothers Machine Co.
Valley Iron Works Co.

BASIC WEIGHT SCALES
Thwing-Albert Instrument Co.

BEARINGS
Black Clawson Company
E. D. Jones & Sons Co.
Link Belt Company
Magnus Metal Corp.
The Moore & White Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Stephens-Adamson Mfg. Co.
Timken Roller Bearing Co.
Valley Iron Works Co.

BEATERS AND JORDANS
American Paper Machy. & Engrg. Works, Inc.
The Appleton Machine Co.
Black Clawson Company
Dilts Machine Works
Downingtown Mfg. Co.
E. D. Jones & Sons Co.
Morden Machines Co.
J. J. Ross Company
Ross Paper Machy. Co.
Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.

BED PLATES
Bahr Brothers Mfg. Co.
Dilts Machine Works, Inc.
Downingtown Mfg. Co.
Farrel-Birmingham Co., Inc.
E. D. Jones & Sons Co.
Lukenweld Div., Lukens Steel Co.
Shartle Brothers Machine Co.
Valley Iron Works Co.

BELTING
Alexander Brothers
Allis-Chalmers Mfg. Co.
The Goodyear Tire & Rubber Company
Link Belt Company

BIN DISCHARGERS
Stephens-Adamson Mfg. Co.

BLEACHING AGENTS
E. I. Du Pont De Nemours & Co., Inc.
General Dyestuff Corp.
Rohm & Haas Co.
Virginia Smelting Co.

BLEACHING APPARATUS
E. D. Jones & Sons Co.
Perkins & Sons, Inc., B. F.
Moore & White Co.
Niagara Alkali Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

BLOW PIPES & PITS
Carthage Machine Co.
Kalamazoo Tank & Silo Co.
Moore & White Co.
Murray Mfg. Co., D. J.
Walworth Company

BOILERS
Babcock & Wilcox Co.

BOTTOMS
Kalamazoo Tank & Silo Co.
Valley Iron Works Co.

BOXBOARD SCALES
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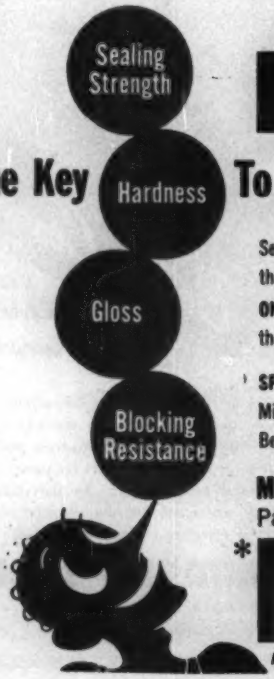

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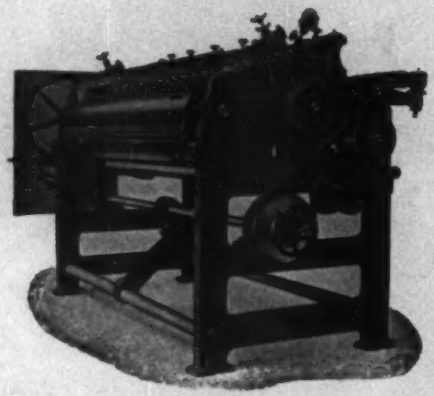

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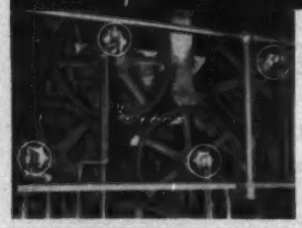

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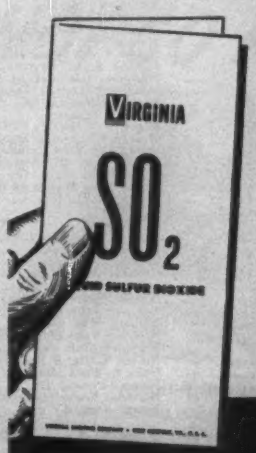

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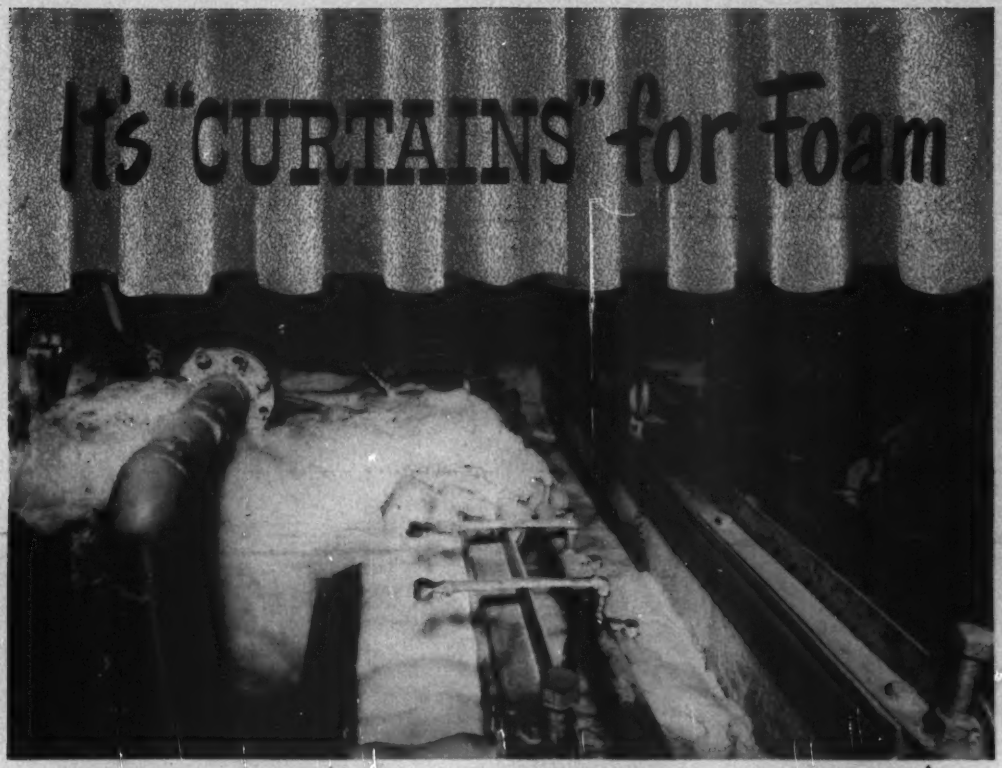

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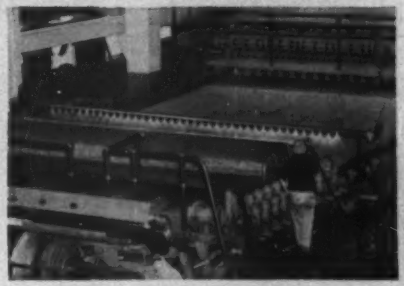

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